TC-K222ESL/K870ES

SERVICE MANUAL

E Model
TC-K222ESL
US Model
Canadian Model
UK Model
E Model
TC-K870ES

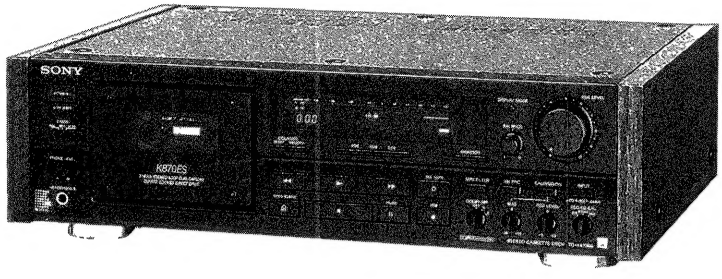

Photo : TC-K870ES

Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.
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Model Name Using Similar Mechanism	TC-K222ESG
Base Unit Name	TCM-200D4

SPECIFICATIONS

Recording system — 4-track 2-channel stereo
Fast winding time — Approx. 90 sec. (with Sony C-60 cassette)
Bias — AC bias
Heads — Erasing head × 1 (LA head)
Recording head × 1 (LA head)
Playback head × 1 (LA head)
Motors — Capstan motor × 1 (direct-drive linear torque BSL motor)
Reel motor × 1 (DC motor)
DC motor × 1
Wow and flutter — ±0.04% W.Peak (IEC)
0.024% WRMS (NAB)
±0.065% W.Pead (DIN)

Signal-to-noise ratio (NAB, at peak level)

Dolby NR switch / Cassette	OFF	B-Type ON	C-Type ON
Type IV (Sony METAL-S/SLT)	61 dB	70 dB	76 dB
Type II (Sony UX-S)	59 dB	68 dB	74 dB
Type I (Sony HF-S)	57 dB	66 dB	72 dB

Total harmonic distortion — 1.0% (with Sony METAL-S/SLT cassette)
Frequency response (DOLBY NR OFF)

Type IV cassette (Sony METAL-S/SLT)	15 - 22,000 Hz (±3 dB) 15 - 16,000 Hz (±3 dB 0VU recording)
Type II cassette (Sony UX-S)	15 - 20,000 Hz (±3 dB)
Type I cassette (Sony HF-S)	15 - 17,000 Hz (±3 dB)

Inputs

Line inputs (phono jacks) CD DIRECT input (phono jacks)	Sensitivity	77.5 mV
	Input impedance	47 kohms

Outputs

Line outputs (phono jacks)	Rated output level	0.44 V at a load impedance of 47 kohms
	Load impedance	Over 10 kohms
Headphones (stereo phone jack)	Output level	0 - 2.5 mW at a load impedance of 32 ohms

General
Power requirements — Model for European countries:
220 - 230 V AC, (or 240 V AC adjustable by Sony personnel), 50/60 Hz
Model for US, Canada:
120 V AC, 60 Hz
Model for the United Kingdom:
240 V AC (or 220 V AC adjustable by Sony personnel), 50/60 Hz
Model for other countries:
120, 220, or 240 V AC adjustable,50/60 Hz
Power consumption — 23 W

– Continued on next page –

STEREO CASSETTE DECK

SONY®

Dimensions	Approx. 430 × 135 × 350 mm (w/h/d) (17 × 5 3/8 × 13 7/8 inches) Approx. 470 × 135 × 350 mm (w/h/d)* (18 5/8 × 5 3/8 × 13 7/8 inches)*
Weight	Approx. 6.9 kg (15 lbs 4 oz) Approx. 7.9 kg (17 lbs 7 oz)*

* including projecting parts, controls and wooden side panels

Supplied accessories Audio connecting cord (2)
Wireless remote commander J701 (1)**
Sony size AA (R6) batteries (2)**

** Except for the United Kingdom, Canada and Germany model

Design and specifications subject to change without notice.

Note
This appliance conforms with EEC Directive 87/308/EEC regarding interference suppression.

TABLE OF CONTENTS

SAFETY-RELATED COMPONENT WARNING!!

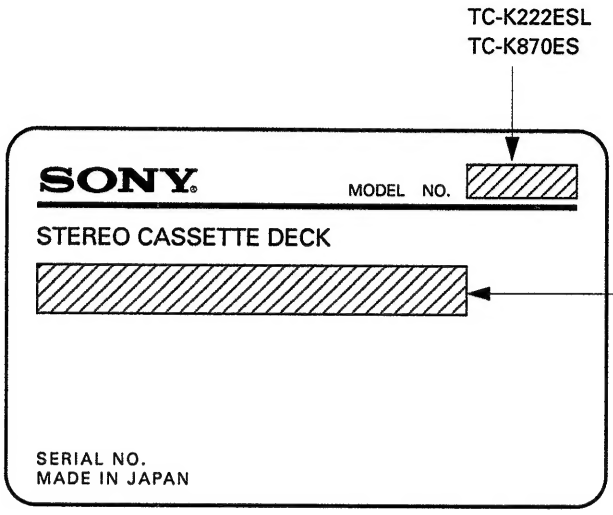
COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

MODEL IDENTIFICATION

– PANEL , BACK –



US, Canadian MODEL :	AC 120V, 60Hz 23w
UK MODEL :	AC240V, 50/60Hz
Germany MODEL :	AC220-230V, 50/60Hz
E MODEL :	AC120, 220, 240V, 50/60Hz 23w

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer: Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig.A)

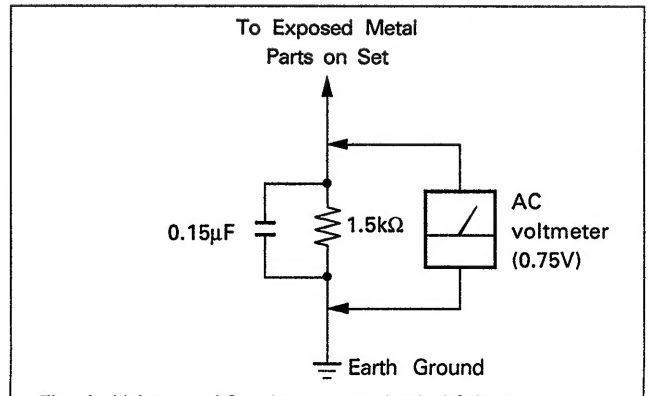
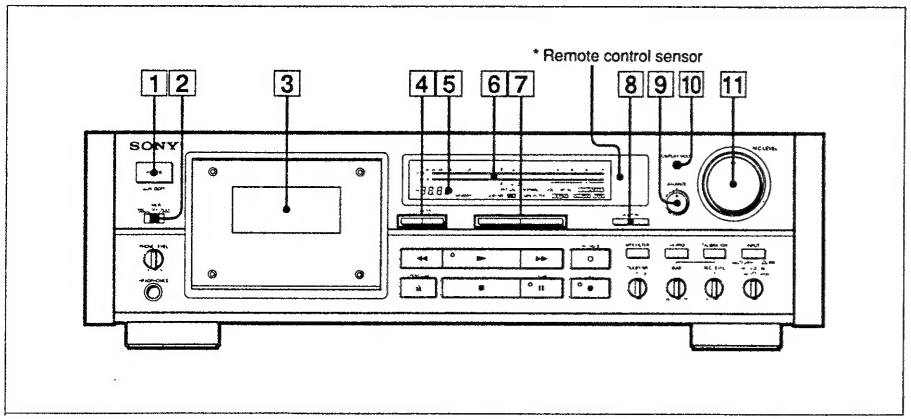


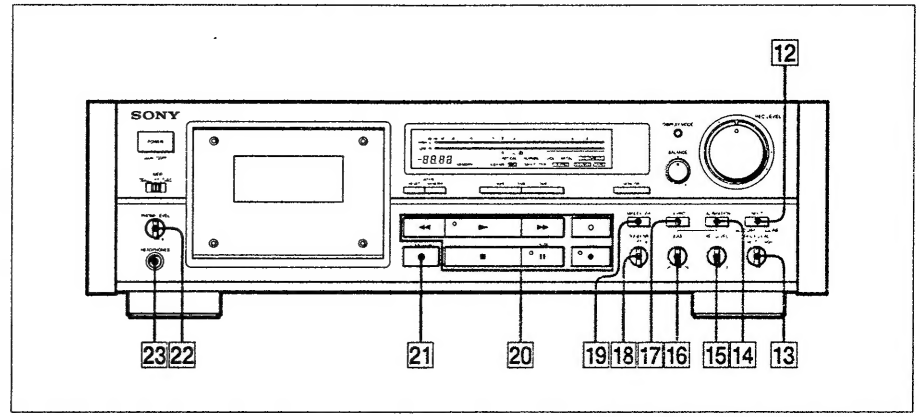
Fig. A. Using an AC voltmeter to check AC leakage.

SECTION 1
GENERAL

This section is extracted from instruction manual.

Identification of Front Panel Parts





For details, refer to the page number indicated in ●.

1. **POWER switch**
2. **TIMER switch** ⑮
3. **Cassette holder**
4. **Counter buttons**
   RESET button ⑳
   MEMORY button ㉘ ⑳
5. **LINEAR COUNTER** ㉜
6. **PEAK PROGRAM METER** ㉝

* **Remote control sensor**
You can remotely control this cassette deck with:
— A remote commander that came with a Sony amplifier or receiver if it has the **F** mark and cassette deck control capability.
— An optional Sony remote commander with the **F** mark and cassette deck control capability.

7. **AMS (Automatic Music Sensor) buttons** ㉕
8. **MONITOR button** ㉔ ㉟ ㊵
9. **BALANCE control**
10. **DISPLAY MODE button** ㉑
11. **REC (recording) LEVEL control** ㉔ ㊳

(Continued on next page.)

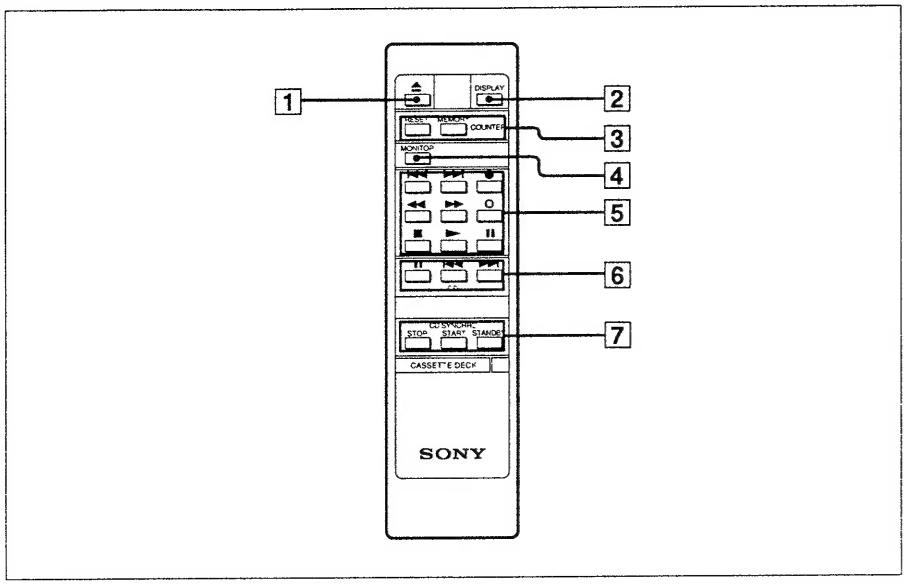
For details, refer to the page number indicated in ●.

(Continued from previous page.)

12. **INPUT button** ㉑
13. **REC EQ CAL (recording equalizing calibration) switch (LOW, NORMAL, HIGH)** ㊺
14. **CALIBRATION button** ㊹
15. **REC (recording) LEVEL control for calibration** ㊷ ㊹
16. **BIAS control** ㊷ ㊹
17. **HX PRO button** ㉛ ㊵
18. **DOLBY NR (noise reduction) switch** ㉒ ㉛
19. **MPX FILTER button** ㉓
20. **Tape operation buttons and indicators**
    ◀◀ (rewind) button
    ■ (stop) button
    ▶ (play) button and indicator
    ▶▶ (fast-forward) button
    ● REC (recording) button and indicator
    II PAUSE button and indicator
    O REC MUTE (record muting) button ㉜
21. **≜ OPEN/CLOSE button**
22. **PHONE (headphones) LEVEL control**
23. **HEADPHONES jack (stereo phone jack)** ㉔

Remote Commander

(Except for the United Kingdom, Canada and Germany mode)



The controls on the remote commander are identical in function and operation to those with the same name on the main unit.

For details, refer to the page number indicated in ●

1 **≜ (open/close) button**

2 **DISPLAY button**

3 **Counter buttons**

4 **MONITOR button**

5 **Tape operation buttons**

6 **CD (Compact Disc) buttons**
for controlling Sony CD players
II (pause) button
I◄◄ / ►►I buttons for locating selections sequentially

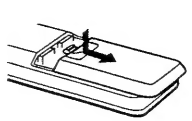
7 **CD SYNCHRO buttons**
for synchronized recording with a Sony CD player

Installing Batteries

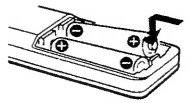
On battery life
- About half a year of normal operation can be expected when using the Sony SUM-3(NS) batteries.
- When the batteries are run down, the remote commander will not operate the unit. In this case, replace both batteries with new ones.

On handling
- Keep the commander away from extremely hot or humid places.
- Avoid dropping any foreign objects into the commander casing, particularly when replacing the batteries.
- Avoid exposing the remote sensor to direct sunlight or lighting apparatus. Such exposure can cause a malfunction.
- To avoid damage caused by battery leakage and corrosion, remove the batteries when the commander will not be used for a long time.

1

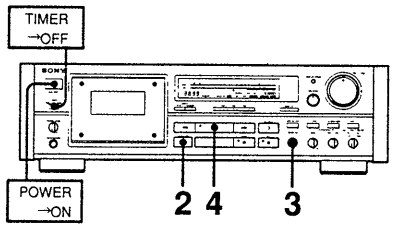


2 Insert two size -AA(R6) batteries.



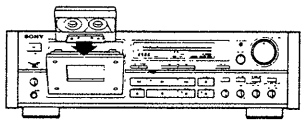
Playing Back

Follow the procedure below to play back a cassette.



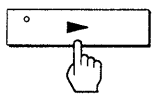
1 Turn on the amplifier and select the tape function.

2 Insert a cassette.



3 Set DOLBY NR to the same position that was used when the cassette was recorded.

4 Start playback.



To stop playback, press the ■ button.
To stop playback momentarily, press the ❚❚ button.
To restart playback, press the ❚❚ or ► button.
To fastwind a tape rightward, press the ▶▶ button in stop mode.
To fastwind the tape leftward, press the ◀◀ button in stop mode.

Selecting the display mode
You may choose among three display modes by pressing the DISPLAY MODE button: (1) all indications are displayed; (2) only the counter is displayed; or (3)no display.

The TIMER switch must be set to OFF
Otherwise, recording or playback will start automatically when the power is turned on.

Is it necessary to set the tape type being used?
No. The deck has an automatic tape type detection system.

To start operations while the cassette holder is open
Operations may be started while the cassette holder is open. For example, when the ▶ button is pressed while the cassette holder is open, the cassette holder will close and playback will start. Similarly, pressing the ◀◀, ▶▶, or ❚❚ buttons while the cassette holder is open will close the cassette holder and start the respective operation.

To change to recording mode during playback
Keeping the ▶ button pressed, press the ● button. The unit immediately switches from playback to recording without stopping the tape. This is useful when editing previously recorded material.

For headphone listening
Connect the headphone plug to the HEAD PHONES jack. The listening level can be controlled with the PHONE LEVEL control.

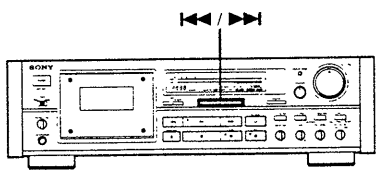
Is it necessary to set the MONITOR button for playback?
No. The TAPE mode is automatically selected and TAPE is displayed.

What is Dolby NR system?
The Dolby NR (noise reduction) system reduces tape hiss noise in low-level, high-frequency signals by boosting the signals during recording and lowering them during playback.

Note
The Dolby HX Pro system is effective only during recording, not during playback.

Locating a Selection
– Automatic Music Sensor (AMS)

The AMS function detects the blank space between selections, allowing you to quickly locate the beginning of desired selections.



During playback, press ▶▶I or I◀◀ referring to the following table.

Desired selection	
Next selection	Selection being played
▶▶I	I◀◀

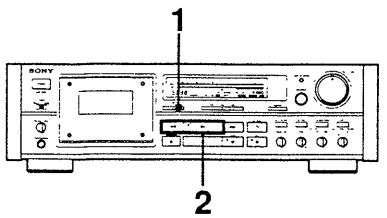
The PLAY indicator flashes while the AMS searches for the beginning of the selection. After locating the beginning of the selection, playback will start automatically.

The AMS may skip a selection in the following cases:
- If the ▶▶I (or I◀◀)button is pressed immediately before the following selection.
- If there is noise in the space between selections.
- If the space is less than four seconds long.

The AMS will treat the following as blanks:
- a long pause in the music
- a passage of low frequencies or very low volume
- a gradual increase or decrease in volume

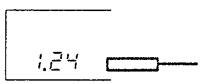
Playing Back Automatically after Rewinding - Auto Play

The Auto Play function automatically starts playing back a cassette after fast winding it to the beginning.

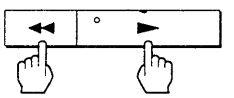


1

Make sure the MEMORY indicator is off. If it is not, press MEMORY.

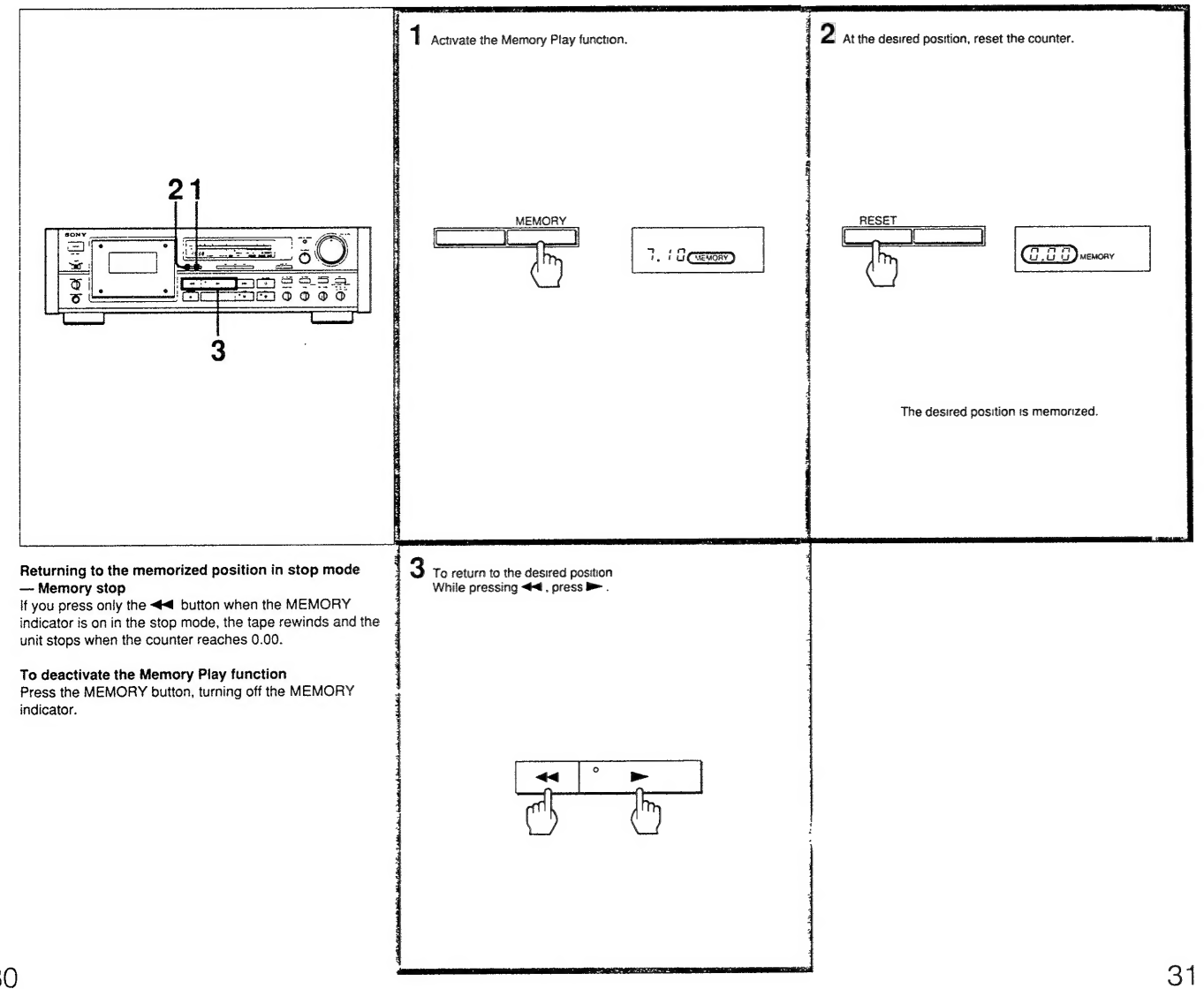


2 While pressing ◄◄, press ►



Locating a Desired Position Using the Counter - Memory Play

The Memory Play function allows you to use the counter to record a desired position on a cassette for fast relocation and automatic playback later.



Returning to the memorized position in stop mode — Memory stop
If you press only the ◄◄ button when the MEMORY indicator is on in the stop mode, the tape rewinds and the unit stops when the counter reaches 0.00.

To deactivate the Memory Play function
Press the MEMORY button, turning off the MEMORY indicator.

The Accuracy of the Linear Counter

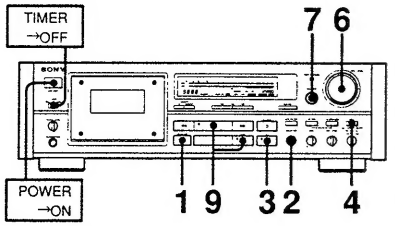
Since the counter is not a digital clock, the number will differ from the actual elapsed playback or recording time by a few minutes, depending on such factors as tape length and hub size.

Note on Memory Play/Stop
In actuality, the tape is rewound to slightly short of 0.00.

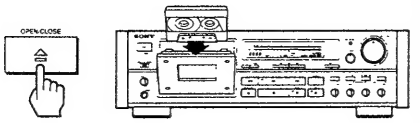
Do not turn off the power while using the counter
Turning the power off, then on again resets the counter to 0.00.

Recording

Follow the procedure below to record a source on a cassette.



1 Insert a cassette.



2 Select the Dolby NR setting.

3 Place the unit into recording pause mode.

4 To record the CD program source through the CD DIRECT input terminal, set INPUT to CD DIRECT.

5 Play the program source to be recorded.

6 Adjust the recording level.

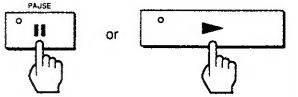
See Adjusting the Recording Level on page 38.

7 Adjust the balance.

(If CD DIRECT is selected in step 4, the BALANCE control is rendered inoperative.)

8 Restart the program source, if required.

9 Start recording.



To stop recording
Press the ■ button.

Regarding CD direct input
Connecting a CD player directly to the CD DIRECT terminals will result in a higher quality recording. However, when the INPUT button is set to CD DIRECT, the BALANCE control and MPX filter are rendered inoperative.

Recording with the Dolby HX Pro system
Press the HX PRO button to turn on the Dolby HX PRO function. Use the MONITOR switch to verify the effects of the function.

If playback starts instead of recording
The cassette tab has been removed. To record on this cassette, cover the hole with plastic tape. (See page 48)

The TIMER switch must be set to OFF
Otherwise, recording or playback will start automatically when the power is turned on.

Is it necessary to set the MONITOR button for recording?
No. The source mode is automatically selected and SOURCE is displayed. If you wish to monitor the recorded sound, press the MONITOR button to select the TAPE mode.

To start recording while the cassette holder is open
If you press the ● button while the cassette holder is open, the holder will close automatically and the unit will switch to recording pause mode. This function allows you to start recording at a moment's notice.

Checking the recording time on a tape
To check the remaining recording time on a tape:
1 Press the RESET button to reset the counter to 0.00.
2 Press ▶▶ to advance the tape to its end. The number on the counter shows the approximate recording time.

To check the total recording time of a tape, first rewind the tape to its beginning, then follow the same steps as above.

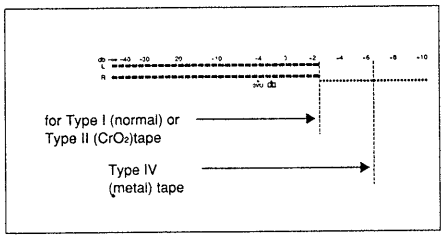
Recording FM Broadcasts with the Dolby NR System

When recording FM broadcasts with the DOLBY NR system, set the MPX FILTER button to ON (the "FILTER" indicator appears).
The MPX filter eliminates remnants of the 19-kHz stereo carrier and 38-kHz subcarrier signals which may impair the operation of the DOLBY NR system. Be sure that the Dolby NR switch is turned on since the MPX filter will not function otherwise. During recording with the Dolby NR system, use this button only if the tuner is not equipped with its own MPX filter or the equipped filter does not function effectively.

Adjusting the Recording Level

The optimum recording level, which differs according to the tape type, is indicated on the PEAK PROGRAM METER for each tape type.
Adjust the REC LEVEL control as high as possible without exceeding the recommended range for the tape type being used.

Recommended maximum PEAK PROGRAM METER reading



Tips on recording level adjustment
- If the recording level setting is too high, the recording will be distorted; if it is too low, the tape will produce a hissing sound. Therefore, the recording level should be set as high as possible without causing distortion.
- If the program source to be recorded has many high frequency signals, set the level to a relatively low position.

Monitoring the Recorded Sound

As this unit has three separate heads for recording, playback and erasure, you can check the quality of a recorded sound by comparing it with the input source signal.

To listen to the input source signal, set the MONITOR button to SOURCE.
To listen to the sound recorded on the tape, set the MONITOR button to TAPE.

While recording, use this monitoring function to check that there is no distortion due to excessive level settings or sound degradation due to head contamination.

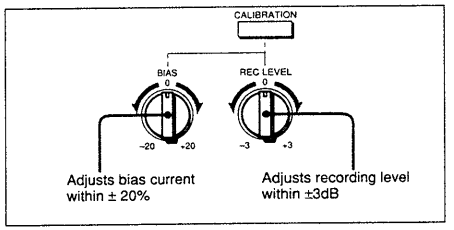
MONITOR button setting and signal flow

MONITOR setting	Signal flow
SOURCE	Band, Recording head, REC LEVEL, LINE IN, SOURCE, MONITOR, LINE OUT, TAPE, HEADPHONES, Playback head. **The source signal can be monitored.**
TAPE	Band, Recording head, REC LEVEL, LINE IN, SOURCE, MONITOR, LINE OUT, TAPE, HEADPHONES, Playback head. **The recorded signal can be monitored.**

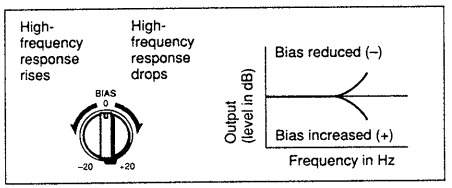
Making an Optimum Recording According to the Tape Type

Bias and Recording Level Calibration

There are many different types of cassettes on the market, each with varying magnetic properties. Although your unit is equipped with the ATS (Automatic Tape Selection) system which sets the appropriate equalization characteristics and bias current for each tape type, an additional calibration adjustment can often produce even better results. Use the bias current and recording level calibration function to obtain the optimum recording conditions for your tape.

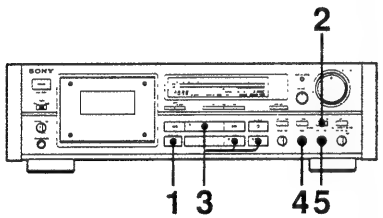


Bias calibration
Choosing the optimum bias current for a tape ensures minimum distortion and flat frequency response. Lowering the bias current boosts high-frequency response, but also results in higher distortion. Raising the bias, on the other hand, reduces distortion, but also dampens high-frequency response. Optimum bias is thus obtained when the bias current and high-frequency response are well balanced.

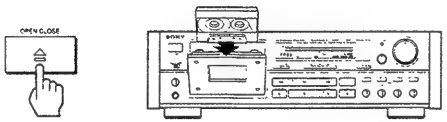


- If the bias current is higher or lower than the optimum setting for a certain tape, the frequency response changes as shown in the chart above. Changing the bias can thus be used to tailor the response to your liking, for example by slightly emphasizing the upper or lower end.
- The frequency response of metal tapes is much less affected by changes in the bias current than other tape types. With some tapes, the adjustment range of this deck (±20%) may therefore not be sufficient to cover every possible requirement.

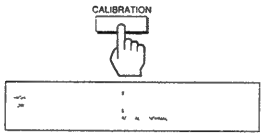
Recording level calibration
Even when the recording level is adjusted correctly, using a tape with low sensitivity will result in a low playback level. The REC LEVEL calibration control allows you to compensate for sensitivity differences among tapes to equalize both recording and playback levels. This is especially important when using the Dolby NR system, since it is most effective when recording and playback levels are the same.



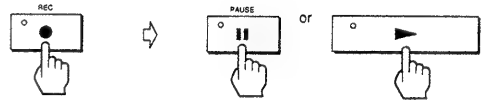
1 Insert the cassette to be used for recording.



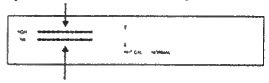
2 Press CALIBRATION.



3 Activate the recording test tones:



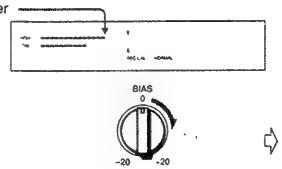
Playback level for an 8-kHz signal



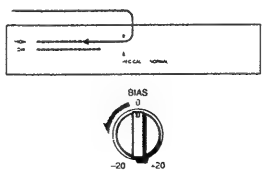
Playback level for a 400-Hz signal

4 Adjust BIAS until both meters indicate equal playback levels.

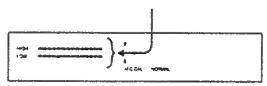
A high reading on the upper meter indicates a low bias current.



A low reading on the upper meter indicates a high bias current.



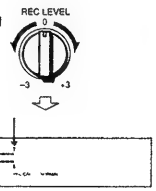
An equal reading on both meters indicates the optimum bias current condition.



5 Adjust REC LEVEL CALIBRATION until both meters reach the recommended level (REC CAL).

The bias current is now adjusted to the optimum level and the tape sensitivity compensation has been set. Press ■, then set CALIBRATION to OFF. Rewind the tape and start the actual recording.

Recommended level

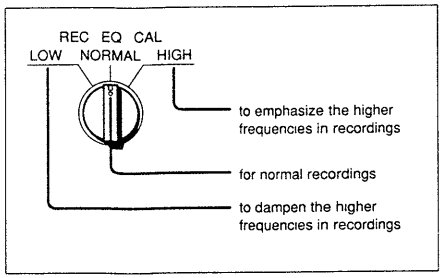


Note

- The sound cannot be monitored during the calibration operation.
- It takes 2 to 3 seconds to stabilize the test tone level.

Recording Equalization Calibration

Although bias currrent and equalization are automatically set by the Automatic Tape Selection (ATS) function for the tape being used, you can use the REC EQ CAL switch to change the recording characteristics according to the nature of the source material or to compensate for the particular characteristics of the tape.



Bias Calibration Recording
To modify bands of sound as required, use the REC EQ CAL switch in conjunction with bias calibration, which enables you to record according to the tape's characteristics.

- **When recording music which has strong middle and low frequencies**
  Set the bias at flat with the REC EQ CAL switch set in the HIGH position to increase the bias current.
  Adjust BIAS so that the HIGH and LOW meters indicate equal readings.

- **When recording music which has strong high frequencies**
  Set the bias at flat with the REC EQ CAL switch set in the LOW position to decrease the bias current.
  Adjust BIAS so that the HIGH and LOW meters indicate equal readings.

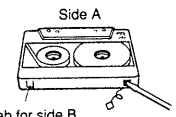
Note
With metal tape, because the amount of frequency characteristic modulation is not in proportion to that of the bias, the optimum bias current may not be obtained using the methods above.

Another use of the REC EQ CAL switch
When using a special tape, the BIAS control with the REC EQ CAL switch set in the NORMAL position may not cause the HIGH and LOW meters to indicate equal readings. If this occurs, adjust the BIAS control after setting the REC EQ CAL switch to HIGH or LQW.

Recording

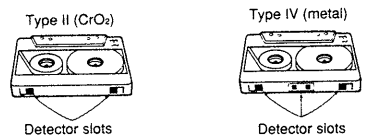
To Protect a Recording

To protect a recording on side A or B
Break out the respective tab.



To recover a cassette for recording
Cover the respective slot with tape.

When using Type II (CrO_2) or Type IV (metal) cassettes
Be careful not to cover the detector slots which are necessary for automatic tape detection.

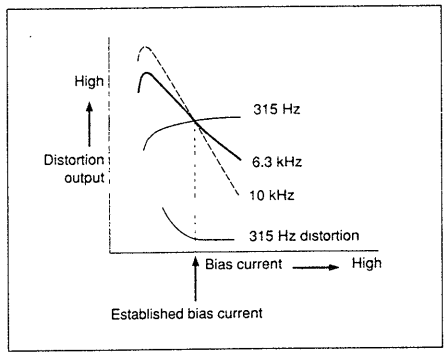


Cassette care
- Avoid touching the tape surface of a cassette to prevent contamination of the heads by dirt, dust, or oil on the skin.
- Keep cassettes away from equipment with magnets, such as speakers and amplifiers, as erasure or distortion on the recorded tape could occur.
- Do not expose cassettes to direct sunlight, extremely cold temperatures or moisture.

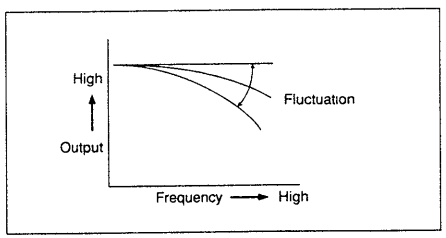
Note on cassettes longer than 90 minutes
The use of cassettes longer than 90 minutes is not recommended except for long continuous playback.

What is the Dolby HX PRO System?

The Dolby HX PRO system provides improved linearity in high-range frequency response during recording. Tapes recorded with this system retain the same high quality even when played back on other tape decks.



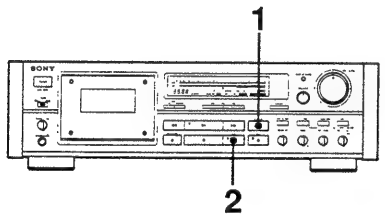
As shown above, characteristics such as output level and distortion differ widely according to the bias (high-frequency) current. In conventional systems, the bias current is susceptible to variations in certain recording signals (see diagram below) which may cause fluctuations in frequency response, distortion, or other unwanted characteristics.



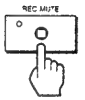
With the Dolby HX PRO system, the effective bias amount added to the bias current is controlled in millisecond units to greatly reduce distortion, improving linearity in high-range response and ensuring high-intensity recording with minimal distortion and noise.

Inserting a Blank Space during Recording – Recording Muting

The Record Muting function allows you to insert a four-second blank to enable proper AMS operation (see page 26), and to replace unwanted input with a blank of any desired length.



1 While recording, press O and release it immediately.



The [REC] indicator starts to blink. During this time, no incoming signals are recorded on the tape.
After four seconds, the ❚❚ indicator lights up and the unit enters recording pause mode.

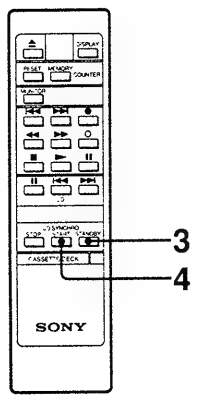
2 Resume recording.

To create a blank longer than four seconds
Press the O button for the desired length of time. After four seconds, the [REC] indicator blinks with greater rapidity. When you release the O button , the ❚❚ indicator lights up and the unit goes into recording pause mode.
Press the ❚❚ button to resume recording.

Synchronized Recording with a CD Player

(Except for the United Kingdom, Canada and Germany model)

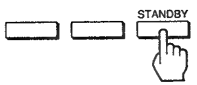
You can use your remote commander to perform synchronized recording operation on your cassette deck and a Sony CD player.



1 Turn on CD player and set the amplifier source to CD.

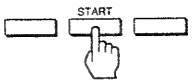
2 Follow steps 2 to 7 on page 34.

3 Press STANDBY.



Return to the start of the CD or selection.

4 Start synchronized recording.

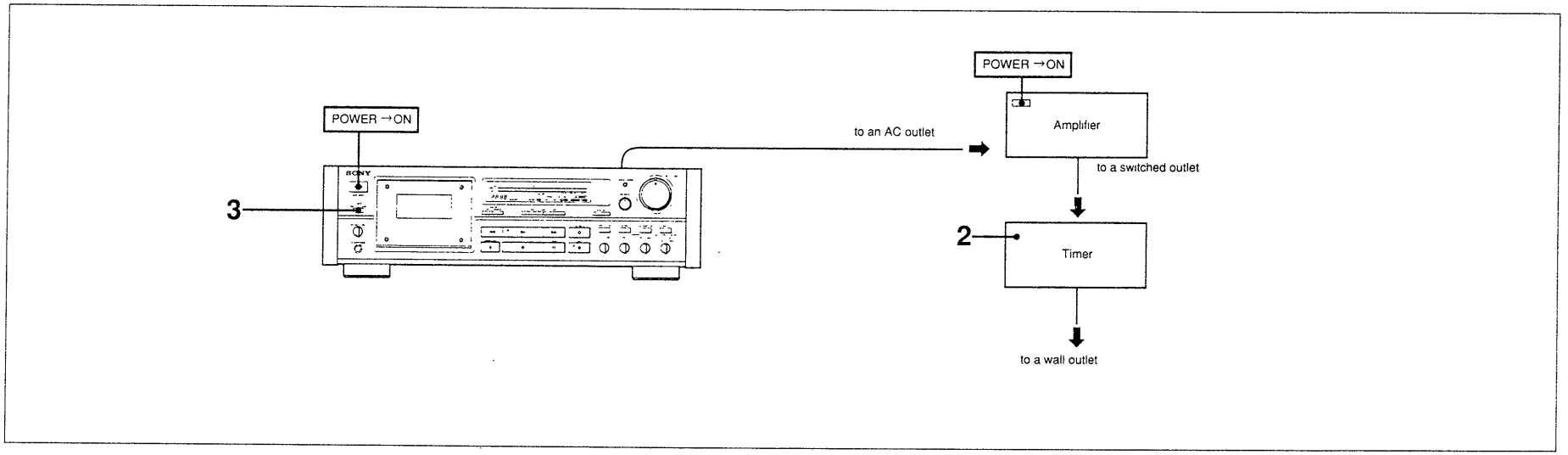


To stop synchronized recording
Press the STOP button on the remote commander.

Notes on CD recording with the remote commander
- Point the remote commander at the remote control sensor and operate the remote commander slowly.
- Do not press the same button (for synchronized recording) repeatedly.

Time-Activated Playback and Recording

By connecting an optional timer, recording or playback can be performed automatically at a preset time.



1 Prepare the unit for playback or recording.

For playback	Follow steps 1 through 3 on page 22.
For recording	Follow steps 1 through 7 on page 34.

Close the holder completely.

2 Set the timer to the desired time.
Power to the tape deck will be cut off.

3 Set the deck's TIMER switch to PLAY or REC.
Playback or recording will start at the preset time.

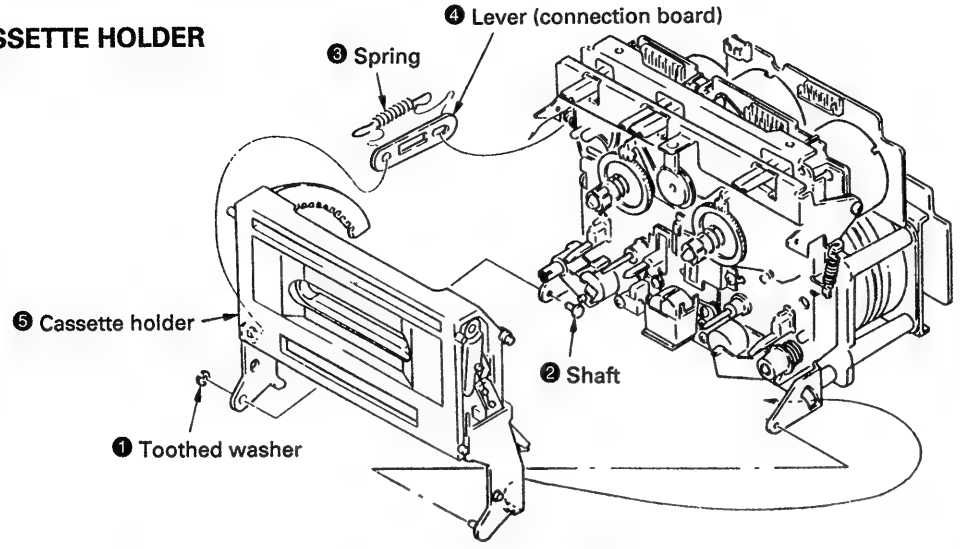
Keep the POWER switch on the unit on
When the timer is set, the power to the unit will be cut off. However, the POWER switch must be on to start timer-activated operation.

When the timer-activated operation is completed
Set the TIMER switch on the unit to OFF. If the TIMER switch is left at REC, the unit will automatically start recording the next time the power is turned on, and the previously recorded material may be erased.

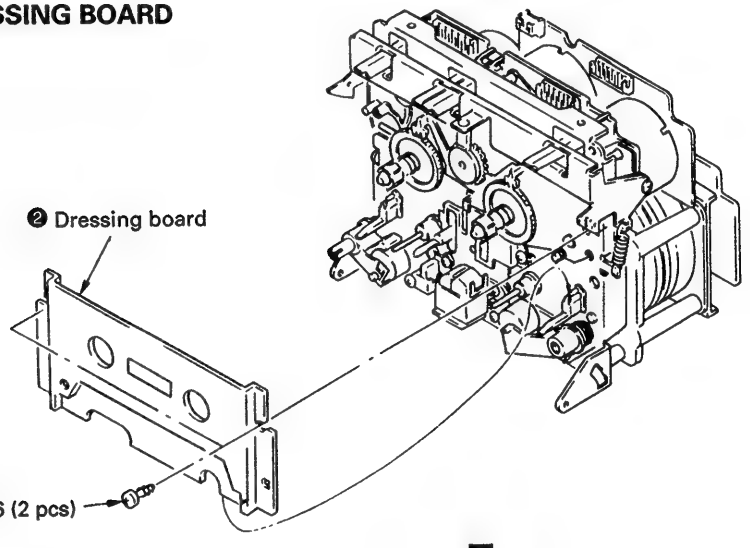
SECTION 2
DISASSEMBLY

- **Remove the following devices shown by ❶, etc. in the order of the numbers.**

CASSETTE HOLDER

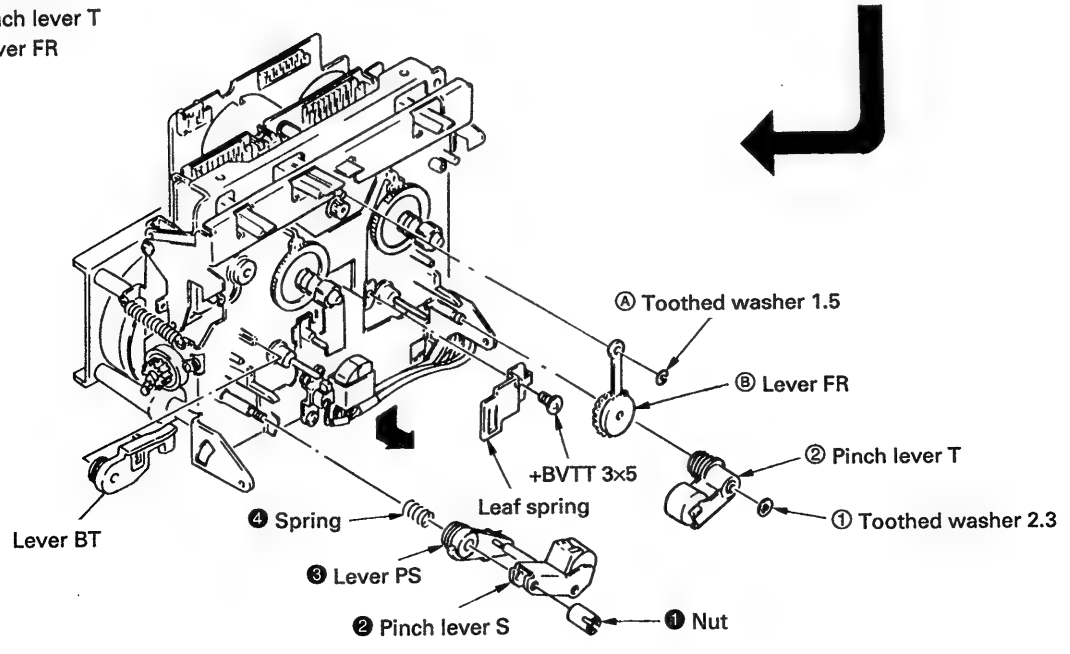


DRESSING BOARD



PINCH LEVER/LEVER FR

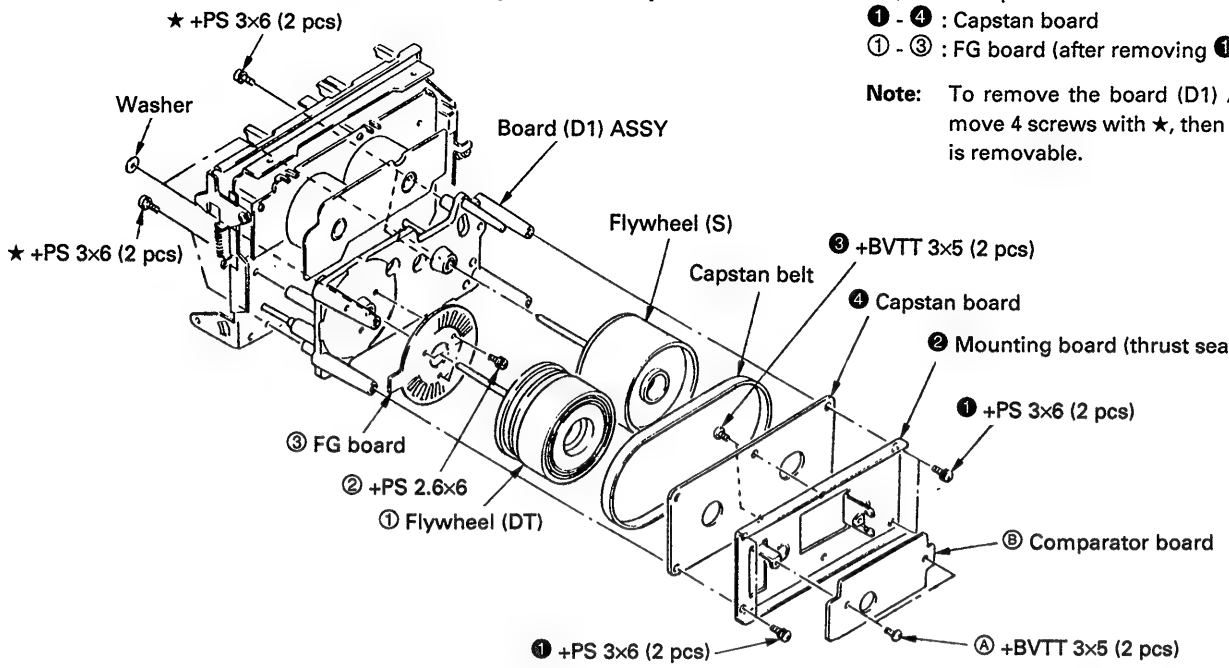
❶ - ❹ : Pinch lever S
① , ② : Pinch lever T
Ⓐ , Ⓑ : Lever FR



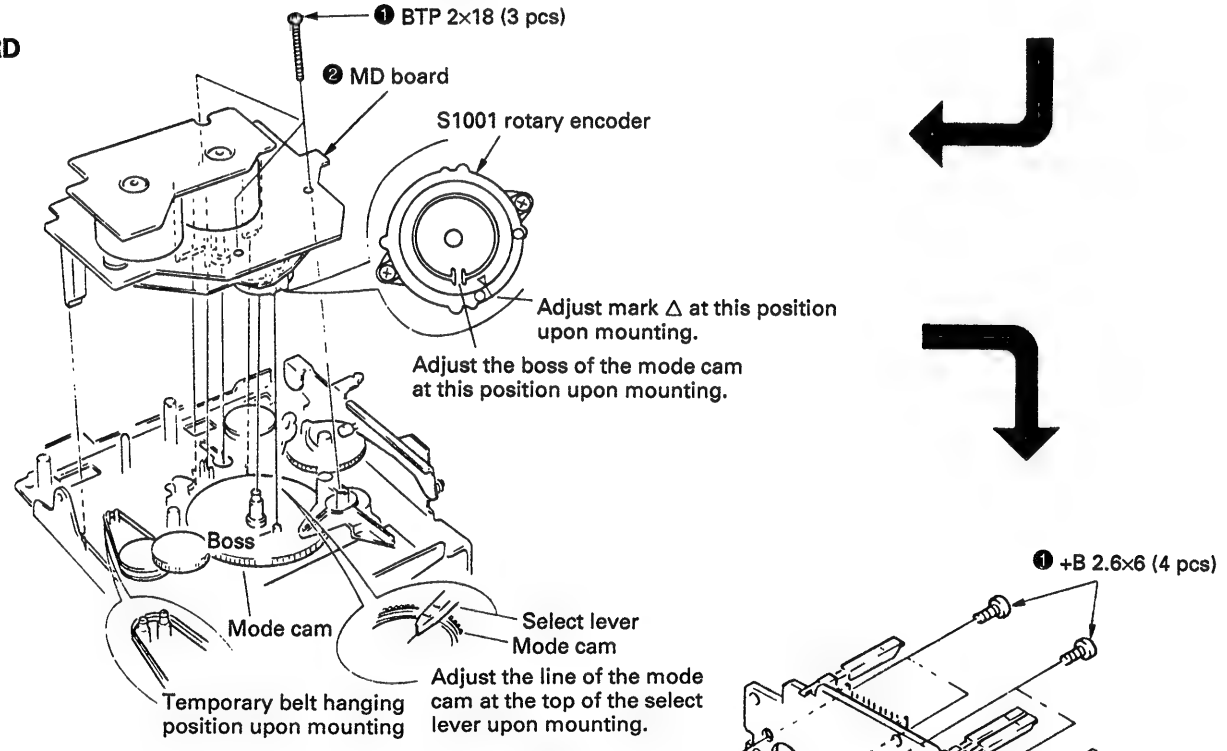
COMPARATOR BOARD/CAPSTAN BOARD/FLYWHEEL/FG BOARD

Ⓐ, Ⓑ : Comparator board
❶ - ❹ : Capstan board
① - ③ : FG board (after removing ❶ and ❷)

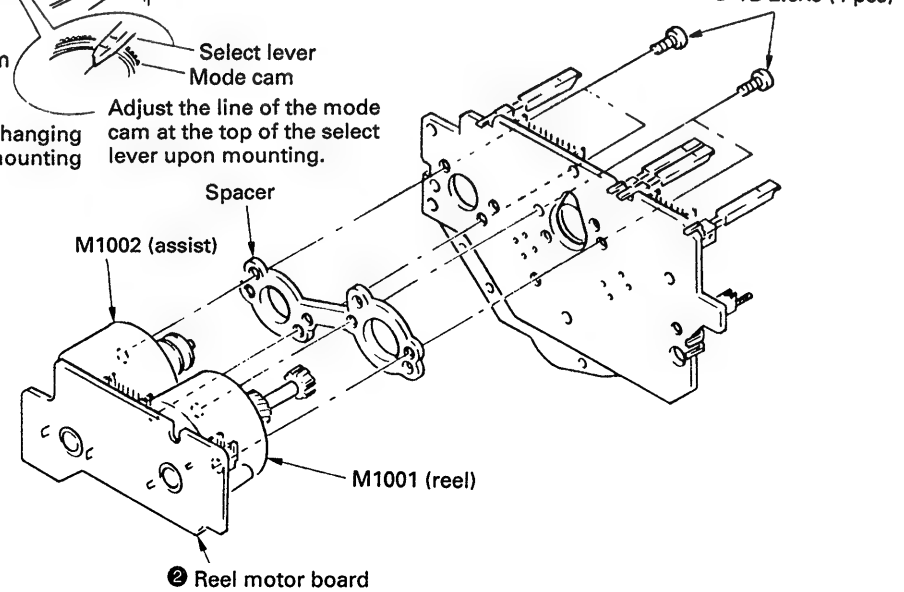
Note: To remove the board (D1) ASSY, remove 4 screws with ★, then the ASSY is removable.



MD BOARD



REEL MOTOR BOARD

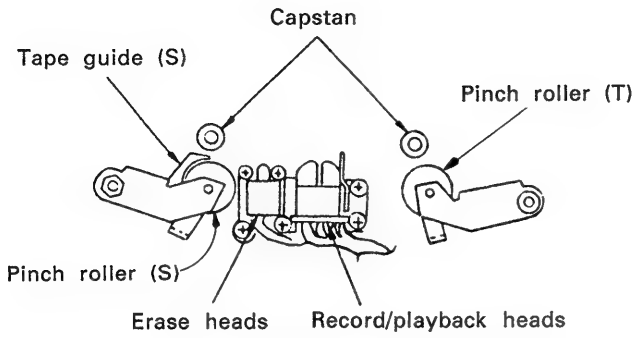


SECTION 3
MECHANICAL ADJUSTMENTS

• **Refer to page 21 for Adjustment Location.**

PRECAUTIONS

1. Clean the following parts with an alcohol-moistened swab. (tape sliding surface)



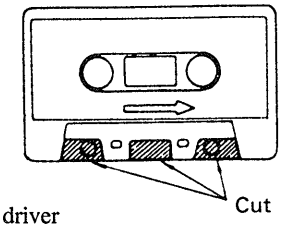
2. Demagnetize the record/playback heads, erase heads and the capstan using the head demagnetizer.
3. Do not use a magnetized screw driver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustment should be performed with the rated power supply voltage unless otherwise noted.

Tape Passing Adjustment

Note: For the following adjustments, use the jig as far as possible. Although the following methods are operable without using the jig, precise adjustment may not be completed, for example no compatibility to other decks is available even if self recording and playback is OK.
In these adjustments, either the pinch roller guide in the S side or the record/playback head guide is referred to for tape pass. Therefore, do not unnecessarily rotate the adjustment screws including those of the erase heads unless any one is replaced. When 2 or more heads or pinch rollers out of these 2 heads and pinch rollers are to be adjusted or replaced, use the jig for the adjustments or replace one at first and then take complete tape pass and then replace the second one.
Head height adjusting jig : apex

Preparation:

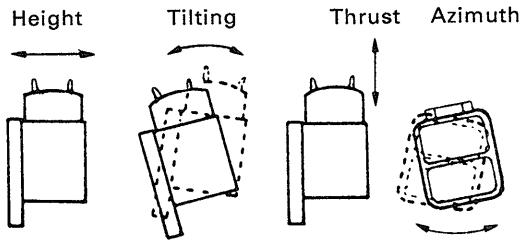
- Mirror cassette CQ009C 8-909-708-01
  (Or CQ012C 8-909-708-02)
  If it is not available, cut a part of the half of a 120 minute cassette tape and use.



- Plus screw driver
  Medium size .....Apply to the head adjusting screw.
  Minus screw driver
  Large size .....Apply to the pinch roller adjusting screw in the S side.
- Pen light
- WS-48B (3kHZ, 0dB)
- P-4-A100 (10kHz, –10dB)

Definition:

The following view relates to record/playback heads.



For the locations of the adjusting screws, see the view "adjustment location" in the lower right corner of Page 21.

Procedure:

Pinch roller in the S side

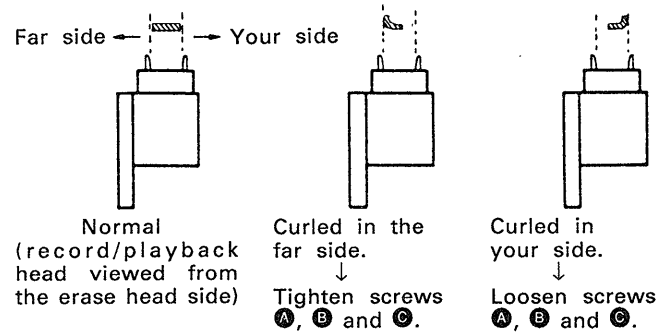
Note: It should be adjusted only when the pinch roller in the S side is replaced.

1. Mount the mirror cassette and set the equipment to playback state.
2. Check that the tape is curled in the pinch roller guide or the guide of the record/playback heads.
   If curled, remedy it by rotating the tape curl adjusting screw Ⓗ. At that time, check that the tape runs near the center part of the erase heads.

Record/playback heads

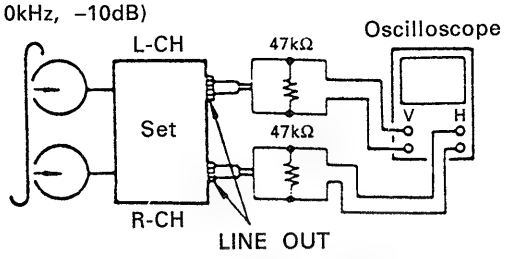
Note: The heads should be adjusted only when the record/playback head is replaced.

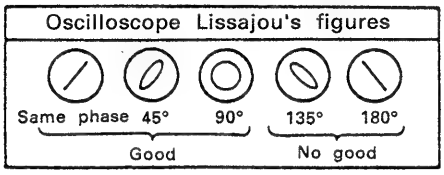
1. Mount the mirror cassette and set the equipment to playback state.
2. (Height adjustment) Check that the tape is curled in the tape guide of the heads. If curled, rotate screws Ⓐ, Ⓑ and Ⓒ in the same angle and move the entire heads parallel. Check the mirror cassette where there is curling and, when curling exists in the lower side (actually in the deep side), tighten all screws slightly. If curled in the upper (your) side, loosen them.



3. (Adjustment of tilting) Adjust back tension to 0 still in playback state (loosen the tape by rotating the reel in the S side using a small tip such as a pencil), and check that there is no curling or snaking (up or down) in the guide of the record/playback heads. Snaking of the tape may occur only within the range of a difference in the widths of the tape and the tape guide (it curls when tape slacks more than the range). Therefore, carefully check it because it may often be overlooked.
   If the tape is snaking, rotate screws Ⓑ and Ⓒ in the same angle and change the tilting of the heads. Tighten or loosen the screws to remedy up or down snaking, respectively.
4. Repeat the adjustment 2 and 3 again and converge the height and tilting to suitable positions.
5. (Tentative adjustments of azimuth) Demagnetize and clean the heads and playback WS48B (3kHZ, 0dB). Rotate the screw Ⓒ so that the pointer of the level meter of the set or connected to LINE OUT becomes maximum. If the screw is rotated more than 1/2 turn, repeat the adjustments again from 1.
6. (Checking of tape pass) Connect an oscilloscope to LINE OUT, replay P-4-A100 (10kHZ, –10dB) to describe Lissajou's figures. At about 20 seconds after beginning playback (the tension in the loop becomes stable), check that the variation of the Lissajou's figures occur within ±90° (more preferably within ±45°). If beyond ±90°, adjustments of tilting or height will not be complete, so finely adjust the equipment again from 1.

Standard adjustment tape
P-4-A100
(10kHz, –10dB)

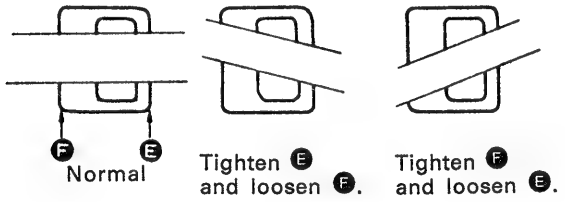




Erase heads

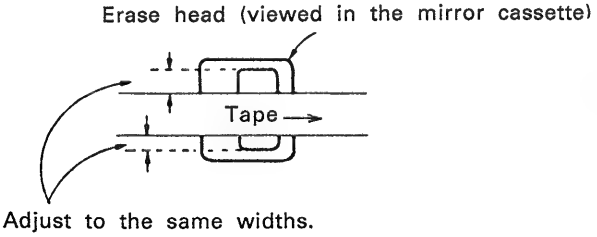
Note: The heads should be adjusted only when the erase head is replaced.

1. Mount the mirror cassette and set the equipment to playback state.
2. (Azimuth adjustments) Adjust screws Ⓔ or Ⓕ so that the tape runs as parallel to the erase heads as possible.

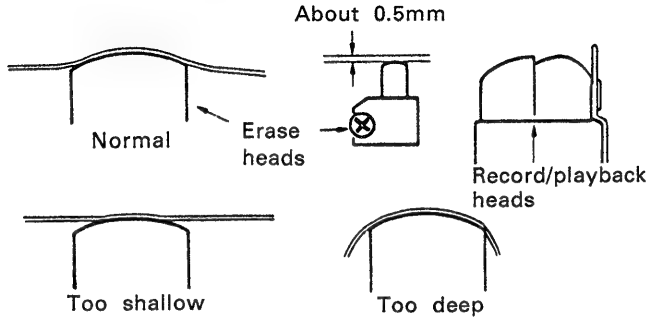


(Erase head viewed in the mirror cassette)

3. (Height adjustment) Rotate screws Ⓓ, Ⓔ and Ⓕ in the same angle so that the widths of erase heads seen in the upper and lower sides of the tape become essentially the same. If the width in the upper or lower side is larger, tighten or loosen the screws, respectively.



4. (Adjustments of tilting) Adjust back tension to 0 still in playback state and check that there is no snaking in the erase heads and pinch roller guide in the S side. If there is, change tilting by rotating the screw Ⓓ. When the tape moves up or down in the mirror tape, tighten or loosen the screw, respectively.
5. Repeat the adjustments again from 2. and converge the height and tilting to more suitable values. And, check that there are no tape curls in the pinch roller guide and the guide of the record/playback heads.
6. (Adjustments of thrust) Slightly loosen the screw Ⓖ and finely adjust it so that the tape smoothly runs over the entire surfaces of the heads by adjusting the thrust of the erase heads to an optimum value relative to the tape.

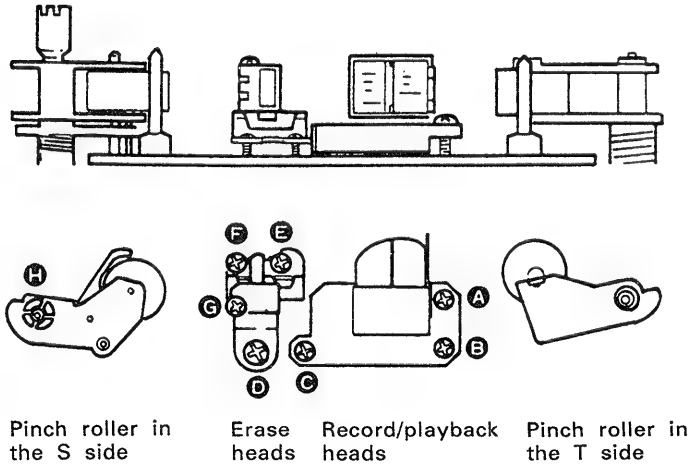


Checking

1. Check that the tape smoothly runs over the entire tape pass without curling or snaking.
2. After the adjustments, apply the locking compound to the screws adjusted (apply the compound to the screw Ⓒ only after the final azimuth adjustments are completed).

Adjustment Location:

The following views relate to those in the mirror cassette (upper) and MD viewed from your side (lower).



SECTION 4
ELECTRICAL ADJUSTMENTS

• Refer to page 25 for Adjustment Location.

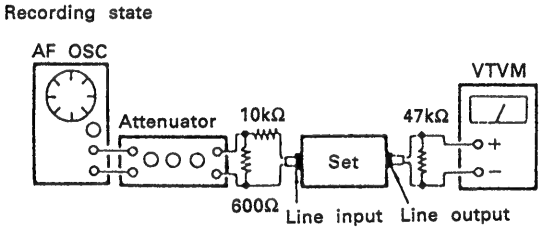
1. Adjust the following in the order of listing. (Adjust the recording system after completion of adjusting the playback system, in general.)
2. Adjustments and measurements should be performed for each channel unless otherwise noted.
3. For simultaneous recording/playback, input a signal into the line and set the equipment to recording state to change the monitor to the tape, immediately playback the recorded signal and issue it from the line output.

- **Switch position**

DOLBY NR ..... OFF
MPX FILTER ..... OFF
TIMER ..... OFF
MONITOR ..... TAPE
HX PRO ..... OFF
CALIBRATION ..... OFF
CD DIRECT ..... OFF
BIAS ..... CENTER CLICK
REC LEVEL ..... CENTER CLICK
BALANCE ..... CENTER CLICK

- **Specified recording position**

Adjust knobs REC LEVEL (RV591) and BALANCE (RV592) so that the following specified input/output signal level are obtained.



Specified input level

Input terminal	LINE IN
Signal source impedance	10kΩ
Input signal level	0.25V (–10dB)

Specified output level

Output terminal	LINE OUT
Load impedance	47kΩ
Output signal level	0.44V (–5dB)

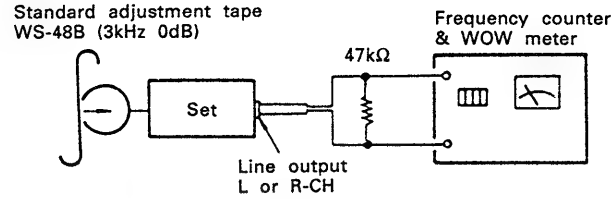
Torque Adjustment

1. Set the torque measuring tape CQ-102C and set the equipment to playback state. Adjust RV801 so that the torque meter indicates 40 ± 3 g.cm.
2. After the completion of the adjustments, measure back tension and FF/REW torques and check that the following specifications are satisfied.

Torque	Torque meter	Meter reading
FWD	CQ-102C	37 - 43g·cm
FWD back tension	CQ-102C	8 - 10.5g·cm
FF/REW	CQ-201B	70 - 120g·cm

Tape Speeds/Wow Checking

Procedure:



1. Playback the top section of the standard tape and measure its output frequency and WOW value.
2. Turn the standard tape upside down, measure the same values and check differences between both measured values. (Difference between the top and the end of the tape)

Adjustable limits:

TAPE SPEED deviation : 2,990 - 3,010 Hz or less
TAPE SPEED variation width : 2,990 - 3,010 Hz or less
WOW (WRMS) : 0.04% or less

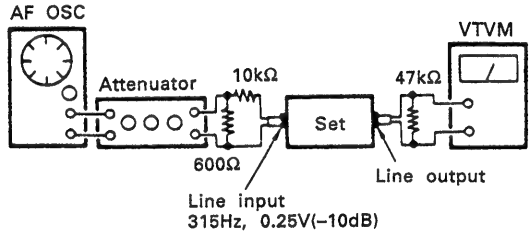
MPX Filter Checking

Conditions:

DOLBY NR switch : OFF
MPX FILTER switch : OFF

Procedure:

1. Mode: Stop state



2. Apply the signal of 315Hz, 0.25V (–10dB) and set REC LEVEL and BALANCE so that the line output level becomes 0.44V (–5dB).
3. Apply the signal of 19kHZ, 0.25V (–10dB) and measure the line output level.

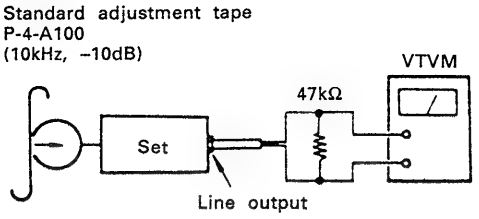
Adjustable limits:

DOLBY NR switch: B or C
MPX FILTER switch: Line output level upon ON
315Hz: Within 0.39 - 0.49V (within –6dB - –4dB)
19kHz: 0.013V (–35dB) or less

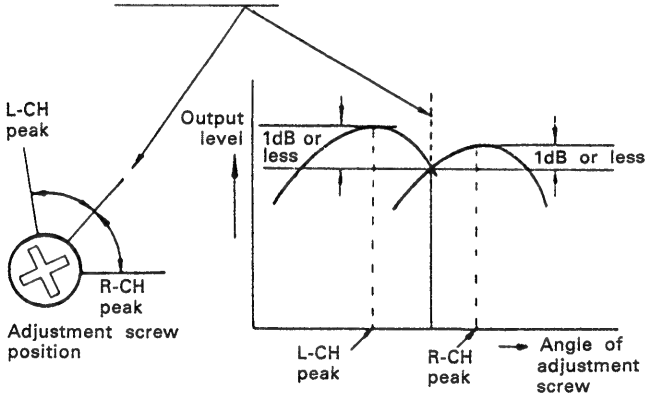
Record/Playback Heads Vertical Adjustment

Procedure:

1. Mode: Playback

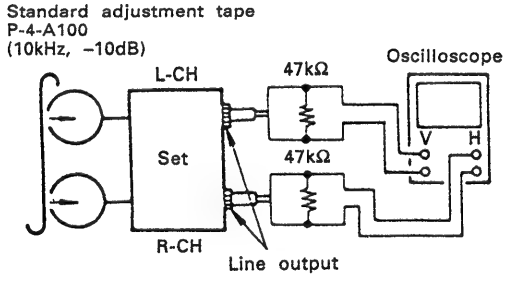


2. Adjust the adjustment screws so that L-CH and R-CH outputs become maximum. If the maximum output points of L-CH and R-CH do not coincide, adjust the screws so that the outputs agree with each other within 1dB from the maximum output value in each channel.

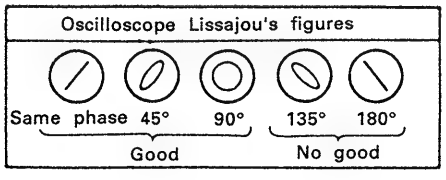


3. Checking of phases

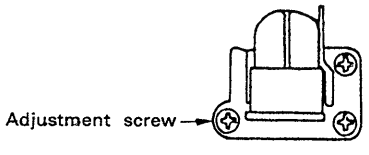
– Playback state –



4. Check that the difference between L-CH and R-CH phases is in the same phase - 90°.



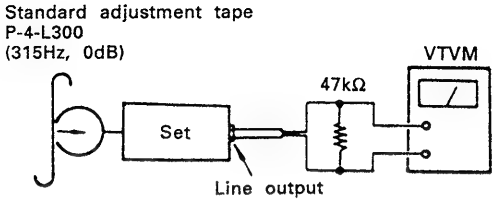
Adjustment Location:



Playback Level Adjustment

Procedure:

1. Playback state



Adjust RV101 (L-CH) and RV201 (R-CH) to satisfy the following specifications.

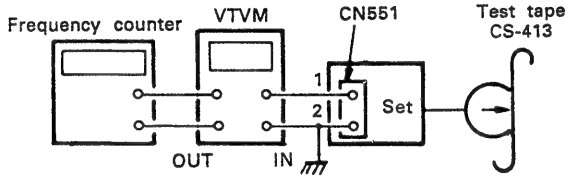
Adjustable limits:

Line output level: 0.42 - 0.46V
(–5.5 - –4.5dB)
Level difference between channels: 0.5dB or less
Check that, by repeating playback and stop, the line output level does not change.

Erase Current Adjustment

Procedure:

1. Mode: record



2. Adjust RV553 so that VTVM indicates 110mA (erase current 110mA).
3. Check oscillation frequency at that time.

Adjustable limits:

Erase current: $110\ ^{+9}_{-5}$ mA
Oscillation frequency: 160 ± 6kHz

Bias Consumption Current Adjustment

Precautions:

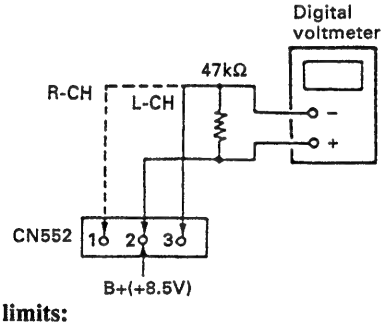
Be sure to adjust bias consumption currents before adjusting recording bias. After completion of adjusting bias consumption currents, again adjust recording bias.

Condition:

HX PRO switch: ON

Procedure:

1. Set the semi-fixed resistances RV303 (L-CH) and RV403 (R-CH) for the adjustment of recording bias and RV554 at a mechanical center and set the equipment to recording state without signals.
2. Adjust T301 (R-CH) and T401 (L-CH) so that the digital voltmeter indicates a minimum value.



Adjustable limits:

120mV or less
(When measured using CS-413 after completion of adjusting the bias)

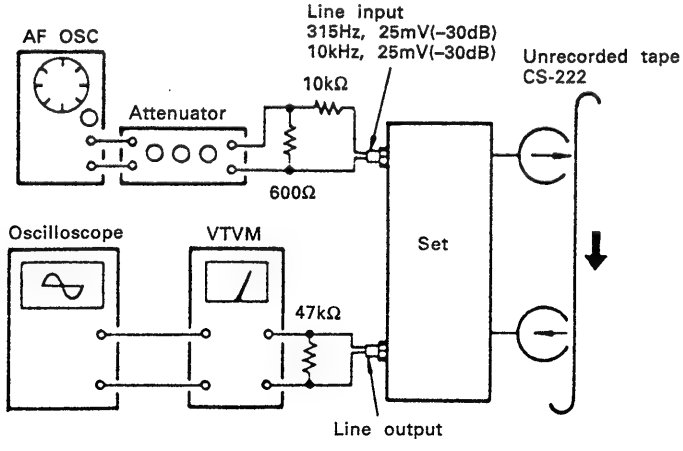
Bias and Recording Level (HX PRO ON) Adjustment

Conditions:

REC LEVEL knob: Specified recording position (see Page 22)
HX PRO switch: ON

Procedure:

1. Simultaneous record/playback state.



2. In order that the minimum output becomes the specified output level:

(1) Adjust RV303 (R-CH) and RV403 (L-CH).
.....Bias adjustment

(2) Adjust RV301 (R-CH) and RV403 (L-CH).
.....Recording level adjustment

Adjustable limits:

(1) Difference of 10kHz level from 315Hz level: ±0.3dB
(2) Level of 315Hz: –25.3dB - –24.7dB

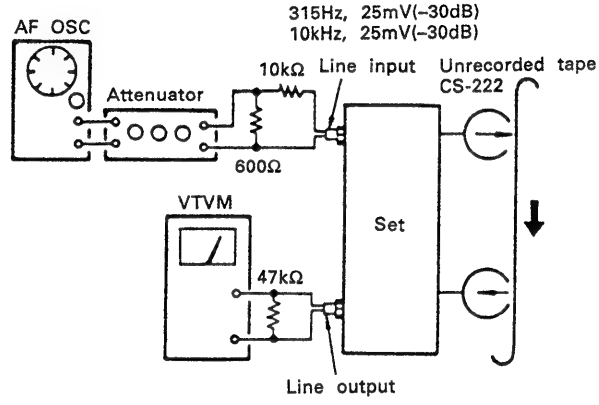
Bias Adjustment (HX PRO ON)

Conditions:

REC LEVEL knob: Specified recording position
HX PRO switch: OFF

Procedure:

1. Simultaneous record/playback state



2. Adjust RV302 (L-CH) and RV402 (R-CH) so that the difference between playback outputs of 10kHz and 315Hz becomes 0.2dB - 0.8dB.

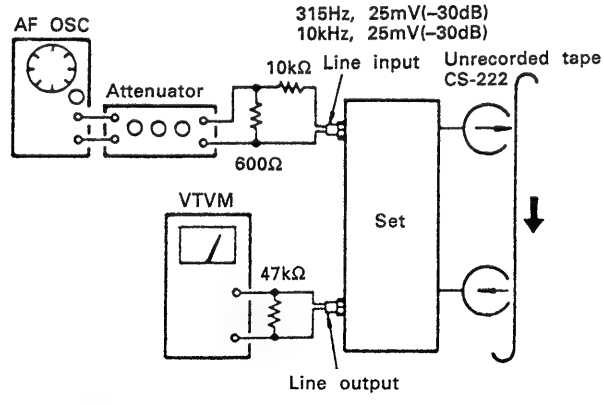
METAL bias Adjustment

Conditions:

REC LEVEL knob: Specified recording position (see Page 22)
HX PRO switch: OFF

Procedure:

1. Simultaneous record/playback state



2. Adjust RV554 so that the difference of the playback output of 10kHz R-CH from the playback output of 315Hz becomes ±0.3dB.

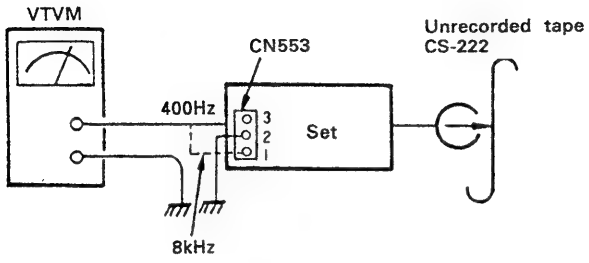
CALIBRATION and Level Meter Adjustment

Condition:

CALIBRATION switch: ON

Procedure (oscillation output level):

1. Recording state (no line input signals)

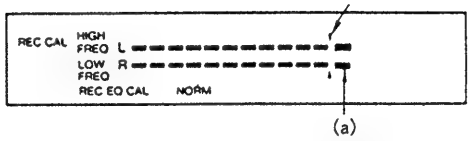


2. Adjust RV551 so that the level of the 400Hz check point becomes 9.5dB - 10.5dB.
3. Adjust RV552 so that the level of the 8kHz check point becomes 9.5dB - 10.5dB.

Procedure (level meter adjustments):

1. Recording state (no line input signals)
2. Set RV202 rather high and gradually decrease the level. Set the knob at a point where the level (a) 1 point higher than 0dB of the LOW FREQ segment (in the lower line) in the CAL level meter goes out.
3. Adjust RV102 so that HIGH FREQ segments (in the upper line) of the CAL level meter light up completely up to the 0dB position.

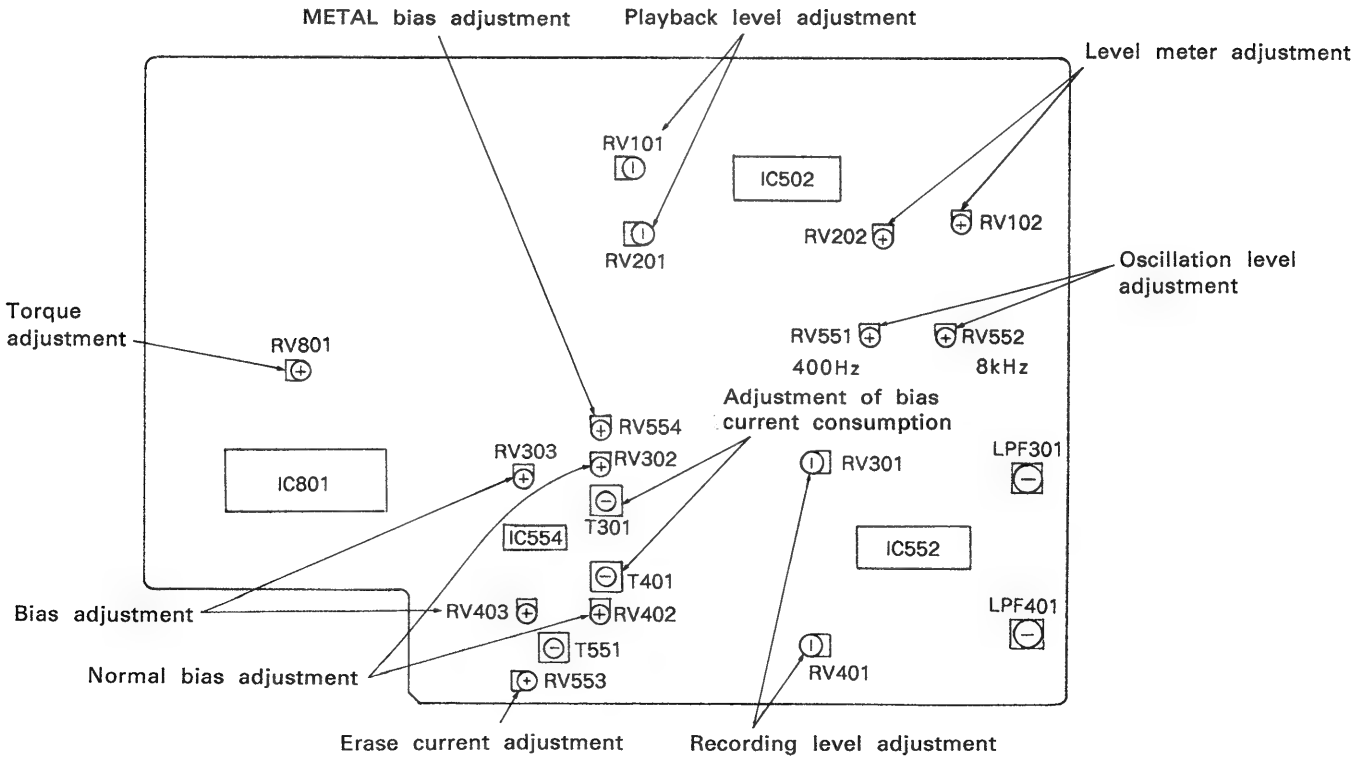
HIGH: The level (a) 1 point higher may also blink.



LOW: The level (a) 1 point higher should not blink.

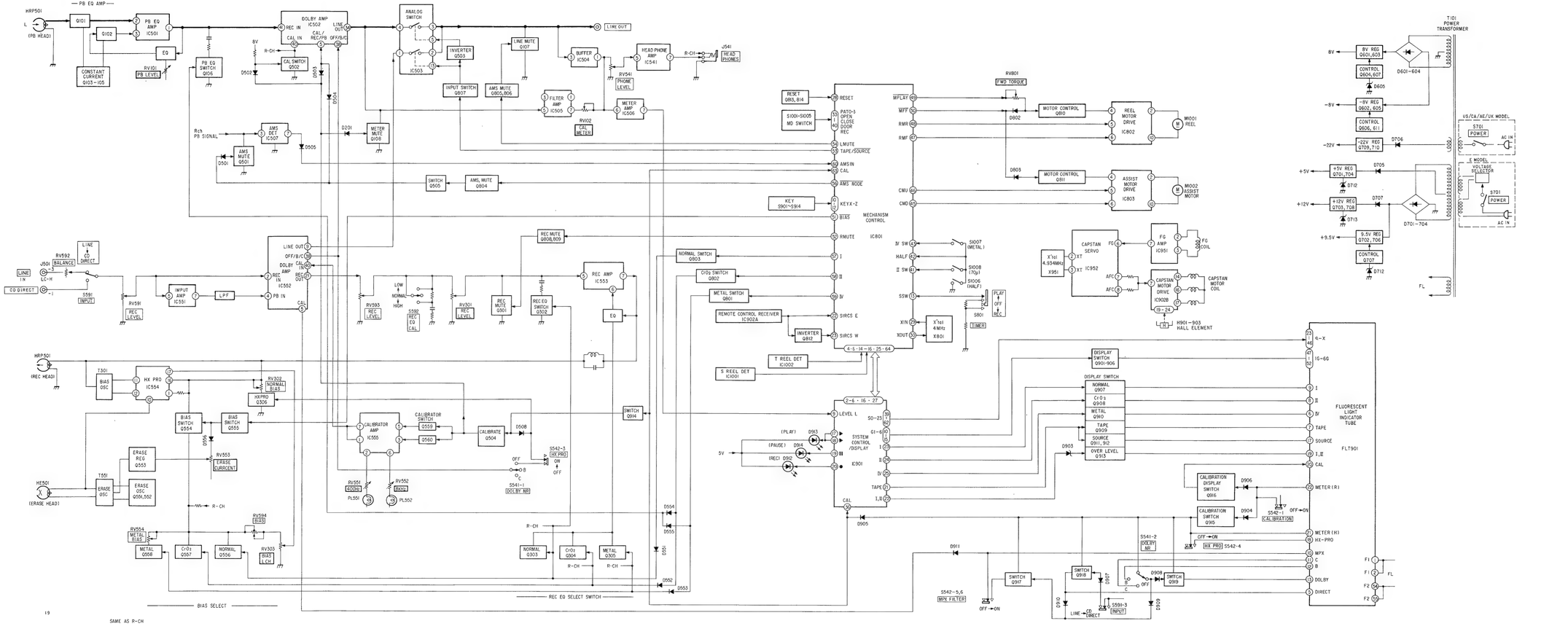
Adjustment Location:

Main (A) PCB – Component side –



SECTION 5
DIAGRAMS

5-1. BLOCK DIAGRAM



5-2. SEMICONDUCTOR LEAD LAYOUTS

LB1641

DTA114ES
DTA144ES
DTC114ES
DTC144ES
2SC2603-EF

BNIL3Z-P
2SA1175-HFE

2SA1409-LK
2SB1116A-L
2SC945-Q

2SK170-BL

2SK246-GR

2SD756

HZS6C3L
HZS9B2L
UZP-8.2BB
ISS202-1

30DF2

10E2N

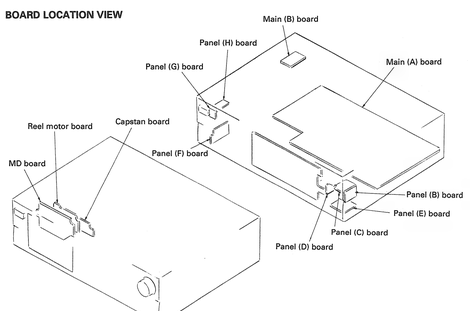
OH009

SEL1210S
SEL1210S-C
SEL1910A-C

GP2S22B

2SA985-A
2SC2275-A

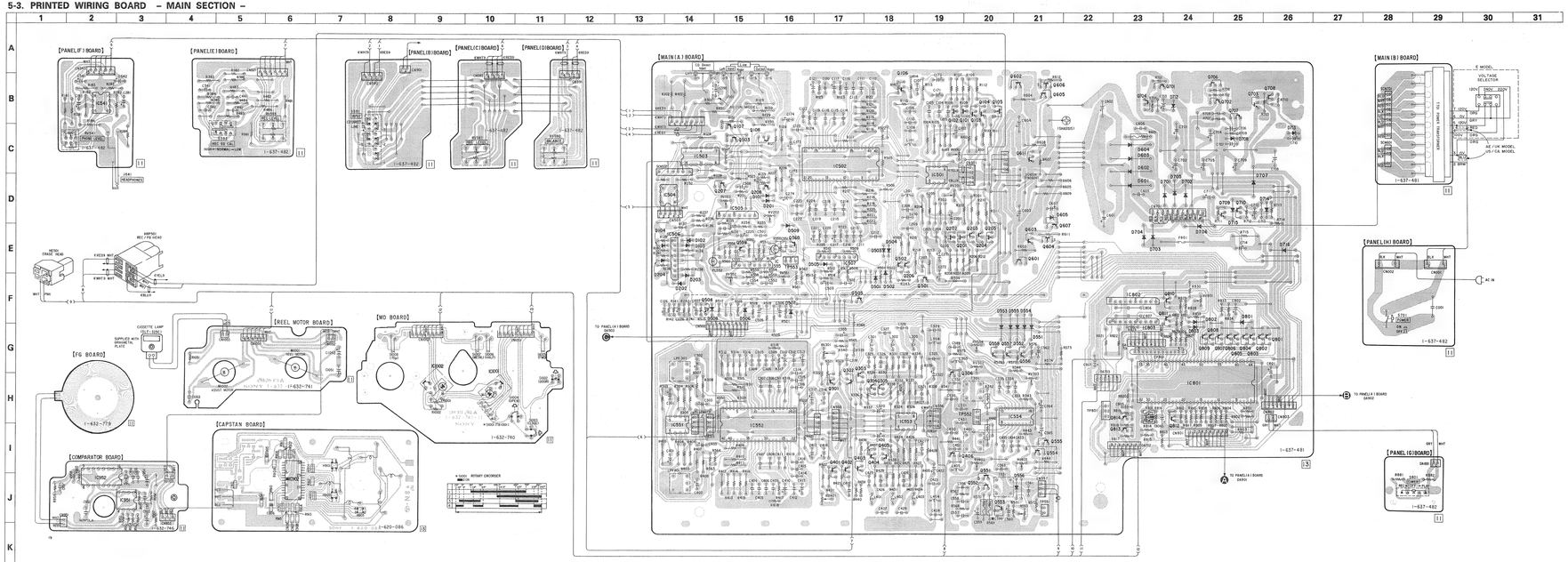
BOARD LOCATION VIEW



• SEMICONDUCTOR LOCATION

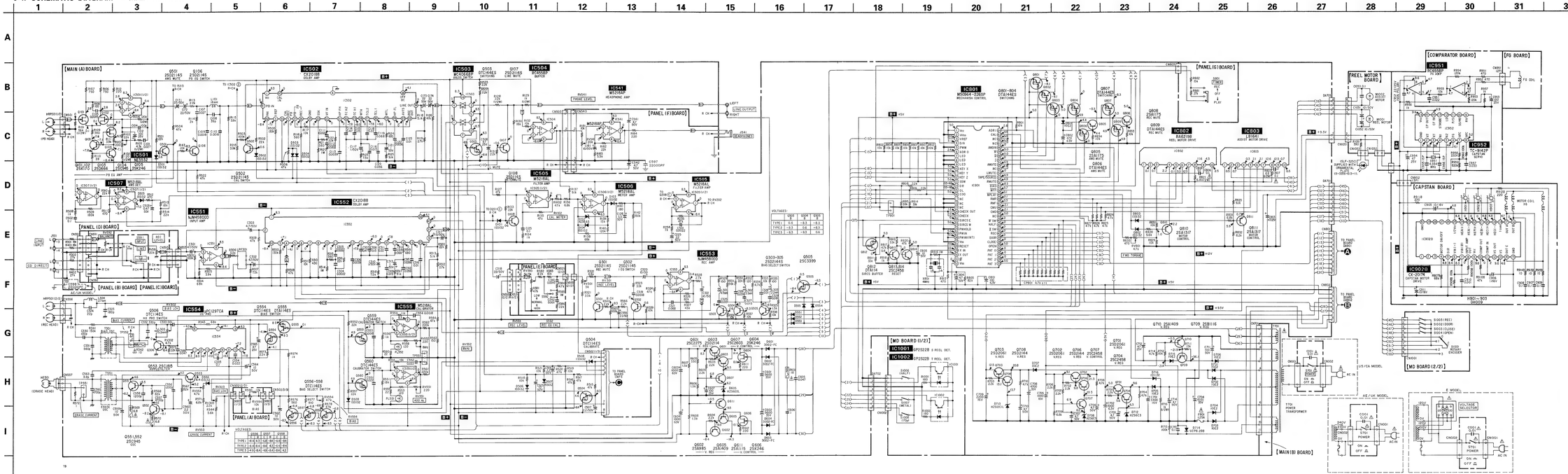
Ref. No.	Location	Ref. No.	Location
D101	D-16	Q105	B-20
D102	E-14	Q106	B-18
D103	E-14	Q107	C-15
D104	E-13	Q108	C-15
D201	D-16	Q201	E-19
D202	F-14	Q202	E-19
D203	F-14	Q203	E-20
D204	F-13	Q204	E-20
D501	F-18	Q205	E-20
D502	F-18	Q206	F-18
D503	F-18	Q207	D-15
D504	E-18	Q208	D-16
D505	E-17	Q301	H-17
D506	F-15	Q302	H-17
D507	F-16	Q303	H-17
D508	F-14	Q304	H-18
D509	E-16	Q305	H-18
D551	G-21	Q306	H-19
D552	G-21	Q401	J-17
D553	G-20	Q402	J-17
D554	G-21	Q403	J-17
D555	G-20	Q404	I-18
D556	J-21	Q405	I-18
D601	D-23	Q406	I-19
D602	D-23	Q501	F-19
D603	C-23	Q502	F-18
D604	C-23	Q503	C-15
D605	E-21	Q504	H-14
D701	D-24	Q505	F-17
D702	D-24	Q551	J-20
D703	E-23	Q552	J-20
D704	E-23	Q553	J-20
D705	D-24	Q554	I-21
D706	E-24	Q555	I-21
D707	D-25	Q556	G-21
D708	C-25	Q557	G-20
D712	B-24	Q558	G-20
D713	C-26	Q559	I-15
D714	D-26	Q560	E-16
D715	D-25	Q601	F-21
D716	E-26	Q602	B-21
D801	G-25	Q603	E-21
D802	G-24	Q604	E-21
D803	G-24	Q605	B-21
		Q606	B-21
IC501	D-19	Q607	E-21
IC502	C-17	Q611	C-21
IC503	C-14	Q701	B-23
IC504	D-14	Q702	B-24
IC505	D-15	Q703	B-25
IC506	E-14	Q704	B-23
IC507	E-17	Q706	B-24
IC541	B-2	Q707	B-25
IC551	I-14	Q708	B-26
IC552	I-15	Q709	D-25
IC553	I-18	Q710	D-25
IC554	I-21	Q801	G-26
IC555	E-15	Q802	G-25
IC801	H-24	Q803	G-25
IC802	F-23	Q804	G-25
IC803	G-23	Q805	G-25
IC902	J-6	Q806	G-25
IC951	J-3	Q807	G-25
IC952	J-2	Q808	G-24
IC1001	H-10	Q809	G-24
IC1002	H-9	Q810	F-24
		Q811	G-24
Q101	B-20	Q812	I-24
Q102	B-19	Q813	I-23
Q103	B-20	Q814	I-23
Q104	B-20		

5-3. PRINTED WIRING BOARD – MAIN SECTION –



Note:
- •o——: indicated a lead wire mounted on the component side.
- • ■ : parts mounted on the conductor side.

5-4. SCHEMATIC DIAGRAM – MAIN SECTION –



Note:

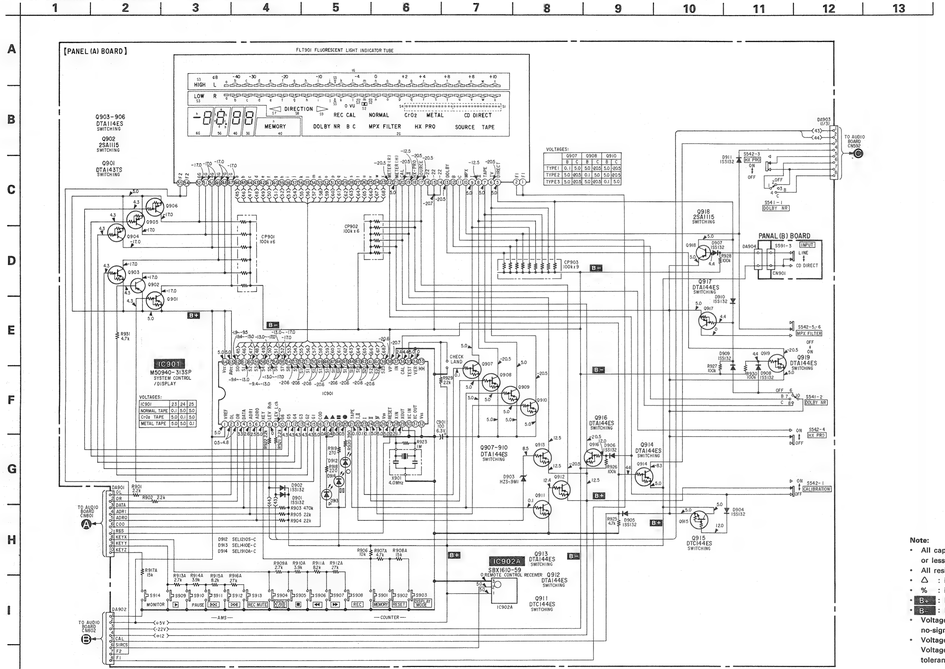
- All capacitors are in µF unless otherwise noted. pF: µµF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, 1/4W or less unless otherwise noted.
- △ : internal component.
- % : indicate a permissible margin.
- R-ch is omitted. It's the same as L-ch.
  Reference numbers of R-ch are 200 series.

The components identified by mark △ or dotted line with mark △ are critical for safety.
Replace only with part number specified.

Les composents identifiés par une marque △ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

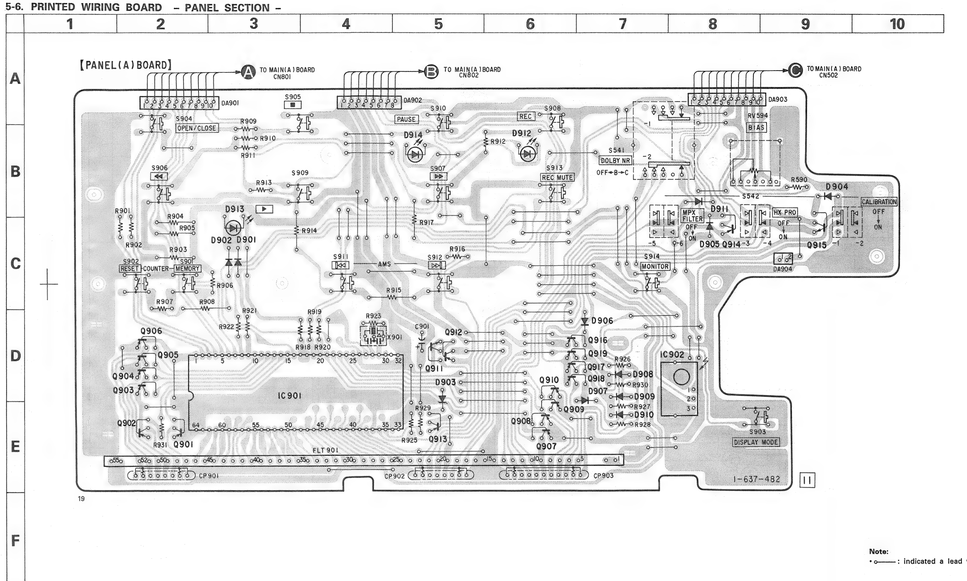
- ⏦⏦⏦ : Fuse resistor
- B+ : B + Line.
- B– : B – Line.
- [ ] : adjustment for repair.
- Voltages are DC between measurement points and ground under no-signal (STOP) conditions.
- no make : Stop
- Voltages are taken with a VOM (input impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Signal path
  ≫ : Playback
  ≪ : Recording

5-5. SCHEMATIC DIAGRAM – PANEL SECTION –



Note:
- All capacitors are in µF unless otherwise noted. pF: µµF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, 1/4W or less unless otherwise noted.
- △ : internal component.
- % : indicate a permissible margin.
- B+L : B + Line.
- B- : B – Line.
- Voltages are DC between measurement points and ground under no-signal (STOP) conditions.
- Voltages are taken with a VOM (input impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.

5-6. PRINTED WIRING BOARD – PANEL SECTION –



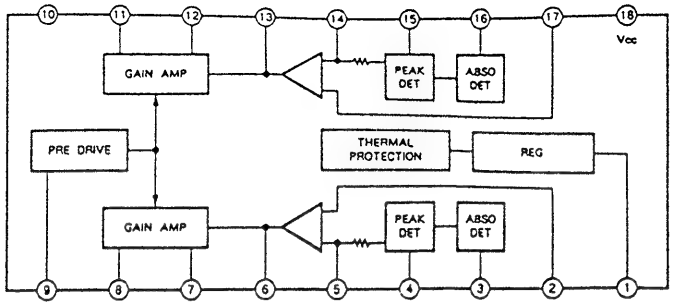
Note:
- •——— : indicated a lead wire mounted on the component side.

• SEMICONDUCTOR LOCATION

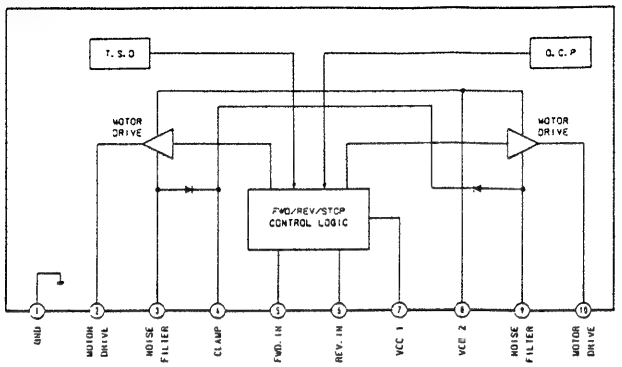
Ref. No.	Location
D901	C-3
D902	C-3
D903	D-5
D904	B-9
D905	C-8
D906	D-7
D907	D-7
D908	D-7
D909	D-7
D910	E-7
D911	B-8
D912	B-6
D913	C-3
D914	B-5
IC901	D-3
IC902	D-8
Q901	E-2
Q902	E-2
Q903	D-2
Q904	D-2
Q905	D-2
Q906	D-2
Q907	E-6
Q908	E-6
Q909	E-6
Q910	D-6
Q911	D-5
Q912	D-5
Q913	D-5
Q914	C-8
Q915	C-9
Q916	D-7
Q917	D-7
Q918	D-7
Q919	D-7

5-7. IC BLOCK DIAGRAMS

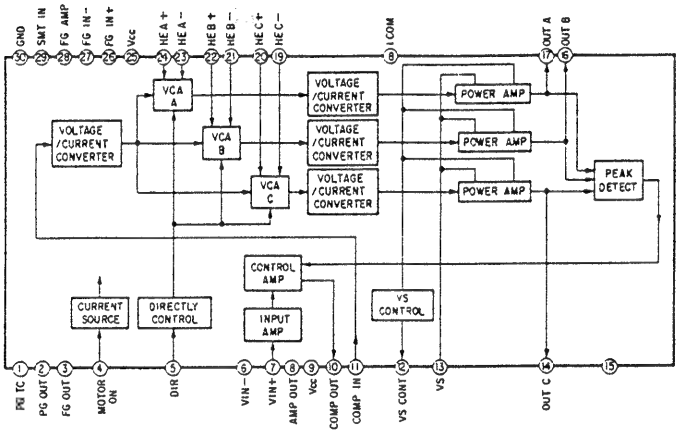
IC554 μPC1297CA



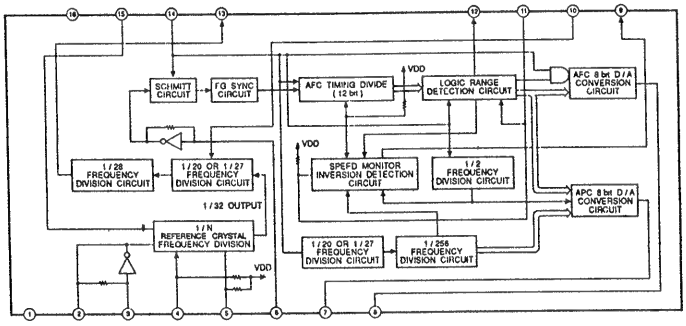
IC803 BA6219B
IC804 LB1641



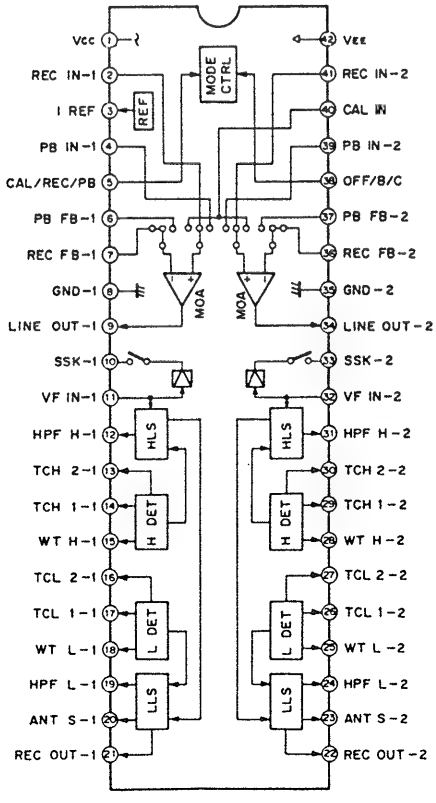
IC902B CX20174



IC952 TC9142P



IC502,552 CX20188



PIN FUNCTION

Pin. No.	Pin. Name	Description
1	Vcc	Positive power terminal
2, 41	REC IN	Recording input terminal
3	I REF	Reference current input terminal
4, 39	PB IN	Playback input terminal
5	CAL/REC/PB	Calibration/recording/playback COS terminal
6, 37	PB FB	Playback feedback terminal
7, 36	REC FB	Recording feedback terminal
8, 35	GND	With 2 power supplies in operation : GND terminal With 1 power supply in operation : Vcc/2 terminal
9, 34	LINE OUT	Line output (decode output) terminal
10, 33	SSK	Spectral skewing switch terminal
11, 32	VF IN	Encode circuit input terminal
12, 31	HPF H	HLS highpass filter terminal
13, 30	TCH 2	HLS detector time constant terminal 2
14, 29	TCH1	HLS detector time constant terminal 1
15, 28	WT H	HLS weighing terminal
16, 27	TCL 2	LLS detector time constant terminal 2
17, 26	TCL 1	LLS detector time constant terminal 1
18, 25	WT L	LLS weighing terminal
19, 24	HPF L	LLS highpass filter terminal
20, 23	ANT S	Anti-saturation terminal
21, 22	REC OUT	Recording output (encode output) terminal
38	OFF/B/C	Dolby NR off/B type/C type COS terminal
40	CAL IN	Calibration input terminal
42	VEE	With 2 power supplies in operation: negative power terminal With 1 power supply in operation: GND terminal

5-8. PIN FUNCTIONS OF IC801 AND IC901

IC801 Master Micon (M50964-226SP)

By entering various switch signals and remote control signals, the mechanical deck is controlled while switching equalizer, mute and other audio signals and transferring data to the display micon.

Pin No.	Pin Name	I/O	Description
1	Vcc	—	Power terminal (+5V)
2	A Vss	—	Power terminal (GND)
3	Vref	I	Reference voltage input (+5V) to the A/D input port
4	DATA	O	Data output (analog) to the display micon (IC901)
5	PWM	—	Not in use with the equipment.
6	ADR0	O	Data output to the display micon (IC901)
7	$\overline{\text{REC}}$	O	Not in use with the equipment. (Connect to GND.)
8	$\overline{\text{PAUSE}}$	O	
9	$\overline{\text{PLAY}}$	O	
10	AD7	I	Key switch input (analog). 0V: "⏏", 1V: "■", 2V: "◀◀", 3V: "▶▶", 4V: "●"
11	AD6	I	Key switch input (analog). 0V: "▶", 1V: "❚❚", 2V: "⏮", 3V: "⏭", 4V: "○"
12	AD5	I	Key switch input (analog). 0V: "RESET", 1V: "MEMORY", 2V: "DISPLAY MODE"
13	TIMER SW	I	Key switch input (analog). 3V: "REC", 4V: "PLAY", 5V: "OFF"
14	T-PULSE	I	Pulse input to the reel stand sensor in the mechanical deck take-up side.
15	S-PULSE	I	Pulse input to the reel stand sensor in the mechanical deck supply side.
16	COUNT0	I	Negative pulse enters when the counter becomes 0.
17	—	—	Not in use with the equipment.
18	RSTOUT	O	Not in use with the equipment (Connect to GND).
19	S-CLOCK	O	
20	S-OUT	O	
21	S-IN	I	Not in use with the equipment. (Pull-up)
22	SIRCS-L	I	Positive phase input of SIRCS signal (remote control).
23	$\overline{\text{SIRCS-E}}$	I	Reverse phase input of SIRCS signal (remote control). SIRCS-L is inverted and entered.
24	POW-OUT	O	Not in use with the equipment. (Open)
25	POWER IN	I	Power down detection input
26	$\overline{\text{INT1}}$	I	Power down detection input
27	CN Vss	—	Power terminal (GND)
28	$\overline{\text{RESET}}$	I	Reset input
29	XIN	I	Clock input (4MHz)
30	XOUT	O	Clock output
31	Φ	—	Not in use with the equipment.
32	Vss	—	Power terminal (GND)
33~36	$\overline{\text{PAT3}}$-$\overline{\text{PAT0}}$	I	Inputs to the rotary encoder for the detection of mechanical deck head base position.
37	$\overline{\text{OPEN SW}}$	I	Input to the mechanical deck OPEN switch (S1004). "L": When the cassette holder completely opens.
38	$\overline{\text{CLOSE SW}}$	I	Input to the mechanical deck CLOSE switch (S1003). "L": When the cassette holder completely closed.
39	$\overline{\text{DOOR SW}}$	I	Input to the mechanical deck DOOR switch (S1002). "L": When the cassette holder is driven from open to close states.
40	$\overline{\text{REC SW}}$	I	Input to the mechanical deck REC switch (S1001). "H": When REC claw is broken.

	PAUSE	AMS	FF/REW	STOP	PLAY		EJECT	
$\overline{\text{PAT3}}$	L	L	L	L	H	H	H	H
$\overline{\text{PAT2}}$	L	L	H	H	L	L	H	H
$\overline{\text{PAT1}}$	L	H	L	H	L	H	L	H
$\overline{\text{PAT0}}$	L	H	H	L	L	L	L	L

<table>
<tr><th>Pin No.</th><th>Pin Name</th><th>I/O</th><th>Description</th></tr>
<tr><td>41</td><td>$\overline{70\mu\ SW}$</td><td>I</td><td>Input to the mechanical deck 70μ switch (S1008). “H”: 70μS, “L”: 120 μS (time constant of playback EQ)</td></tr>
<tr><td>42</td><td>$\overline{HALF\ SW}$</td><td>I</td><td>Input to the mechanical deck HALF switch (S1006). “L”: When a tape is mounted</td></tr>
<tr><td>43</td><td>$\overline{METAL\ SW}$</td><td>I</td><td>Input to the mechanical deck METAL switch (S1007). “H”: METAL tape, “L”: NORMAL or CrO2 tape</td></tr>
<tr><td>44</td><td>—</td><td>—</td><td>Not in use with the equipment.</td></tr>
<tr><td>45</td><td>$\overline{CAM\ UP}$</td><td>O</td><td>Output of the mechanical deck head base UP.</td></tr>
<tr><td>46</td><td>$\overline{CAM\ DOWN}$</td><td>O</td><td>Output of the mechanical deck head base DOWN.
<table>
<tr><th></th><th>STOP</th><th>DOWN</th><th>UP</th><th>STOP</th></tr>
<tr><td>$\overline{CAM\ UP}$</td><td>L</td><td>H</td><td>L</td><td>H</td></tr>
<tr><td>$\overline{CAM\ DOWN}$</td><td>L</td><td>L</td><td>H</td><td>H</td></tr>
</table></td></tr>
<tr><td>47</td><td>$\overline{M\text{-}FWD}$</td><td>O</td><td>The reel motor rotated forwardly.</td></tr>
<tr><td>48</td><td>$\overline{M\text{-}REV}$</td><td>O</td><td>The reel motor rotated Reversely.
<table>
<tr><th></th><th>STOP</th><th>FWD/ CLOSE</th><th>REV/ OPEN</th><th>BRAKE</th></tr>
<tr><td>$\overline{M\text{-}FWD}$</td><td>L</td><td>L</td><td>H</td><td>H</td></tr>
<tr><td>$\overline{M\text{-}REV}$</td><td>L</td><td>H</td><td>L</td><td>H</td></tr>
</table></td></tr>
<tr><td>49</td><td>$\overline{M\text{-}PLAY}$</td><td>O</td><td>“L” When the reel motor is rotated at the PLAY speed.</td></tr>
<tr><td>50</td><td>$\overline{M\text{-}FAST}$</td><td>O</td><td>“L” When the reel motor is rotated at the FF/REW speed.</td></tr>
<tr><td>51</td><td>$\overline{BIAS}$</td><td>O</td><td>Bias oscillation control output. “L”: Oscillation, “H”: OFF</td></tr>
<tr><td>52</td><td>REC MUTE</td><td>O</td><td>REC mute control output. “H”: Mute</td></tr>
<tr><td>53</td><td>MONITER</td><td>O</td><td>Monitor switch output. “H”: Tape, “L”: Source</td></tr>
<tr><td>54</td><td>LINE MUTE</td><td>O</td><td>Line mute control output. “H”: Mute</td></tr>
<tr><td>55</td><td>—</td><td>—</td><td>Not in use with the equipment (Connect to $\overline{AMS\ MODE}$).</td></tr>
<tr><td>56</td><td>$\overline{AMS\ MODE}$</td><td>O</td><td>Output of the AMS switch. It becomes “L” in AMS.</td></tr>
<tr><td>57</td><td>$\overline{TYPE\ I}$</td><td>O</td><td>REC equalizer switching output. With NORMAL tape: “L”</td></tr>
<tr><td>58</td><td>$\overline{TYPE\ II}$</td><td>O</td><td>REC equalizer switching output. With CrO2 tape: “L”</td></tr>
<tr><td>59</td><td>$\overline{TYPE\ IV}$</td><td>O</td><td>REC equalizer switching output. With METAL tape: “L”</td></tr>
<tr><td>60</td><td>AMS SIG</td><td>I</td><td>AMS signal input. No music: “L,” with music: “H”</td></tr>
<tr><td>61</td><td>$\overline{SOURCE\ SW}$</td><td>I</td><td rowspan="2">Not in use with the equipment (Connect to +5V).</td></tr>
<tr><td>62</td><td>$\overline{TAPE\ SW}$</td><td>I</td></tr>
<tr><td>63</td><td>$\overline{CAL\ SW}$</td><td>I</td><td>Input to the calibration switch (S602). “L”: CAL mode, “H”: Normal mode</td></tr>
<tr><td>64</td><td>ADDR1</td><td>O</td><td>Data output to the display micon (IC901)</td></tr>
</table>

IC 901 Display Micon (M50940-313SP)

The captioned micon controls the indications of the 24 segment level meter, counter, etc. according to the instruction of the master micon IC801).

Pin No.	Pin Name	I/O	Description
1	Vref	I	A/D input port reference voltage input (+ 5V)
2	øL	I	Reel base sensor pulse input in the supply side of the mechanical deck
3	øR	I	Reel base sensor pulse input in the take up side of the mechanical deck
4	DATA	I	Data input (analog) from the master micon (IC801)
5, 6	ADR1-ADR0	I	Data input (analog) from the master micon (IC801)
7	KEY	I	Key switch input (analog) 0V : MEMORY, 1.6V : RESET, 3.1V : DISPLAY
8	LEVEL L	I	Level meter Lch input (analog) from the meter amplifier (IC514)
9	LEVEL R	I	Level meter Rch input (analog) from the meter amplifier (IC514)
10–15	$\overline{\text{GRID6}}$-$\overline{\text{GRID1}}$	O	FL tube grid output
16	C00	O	Issues negative pulse when the counter becomes 00.
17	$\overline{\text{PLAY}}$	O	PLAY LED output. Upon "L" it lights up
18	$\overline{\text{PLAY}}$	O	PLAY LED output. Upon "L" it lights up
19	$\overline{\text{PAUSE}}$	O	PAUSE LED output. Upon "L" it lights up
20	$\overline{\text{REC}}$	O	REC LED output. Upon "L" it lights up
21	$\overline{\text{TAPE}}$	O	FL tube segment output (L: TAPE H: SOURCE indication)
22	$\overline{\text{OVER LEVEL}}$	O	FL tube segment output ("OVER LEVEL" indication)
23	$\overline{\text{TYPE I}}$	O	FL tube segment output ("TYPE I" indication)
24	$\overline{\text{TYPE II}}$	O	FL tube segment output ("TYPE II" indication)
25	$\overline{\text{TYPE IV}}$	O	FL tube segment output ("TYPE IV" indication)
26	CNVss	–	Power terminal (GND)
27	$\overline{\text{RESET}}$	I	Reset input
28	XIN	I	Clock input (4 MHz)
29	XOUT	O	Clock output
30	XCIN	–	Not in use with the equipment. (always "L")
31	XCOUT	–	Not in use with the equipment.
32	Vss	–	Power terminal (GND)
33	Ø	O	Not in use with the equipment.
34	VER	I	Version changeover input (always "L")
35	$\overline{\text{TEST}}$	I	Test mode input Upon "L" all meters light up
36	CAL	I	Calibration switch (S602) input Upon "L" CAL mode, Upon "H" normal mode
37	IN	I	Not in use with the equipmnet.
38	VP	I	Power terminal (–22V) to pull down FL tube segment output
39–62	S23–S0	O	FL tube segment output (meter, counter indication)
63	AVcc	–	Power terminal (+ 5V)
64	Vcc	–	Power terminal (+ 5V)

SECTION 6
EXPLODED VIEW

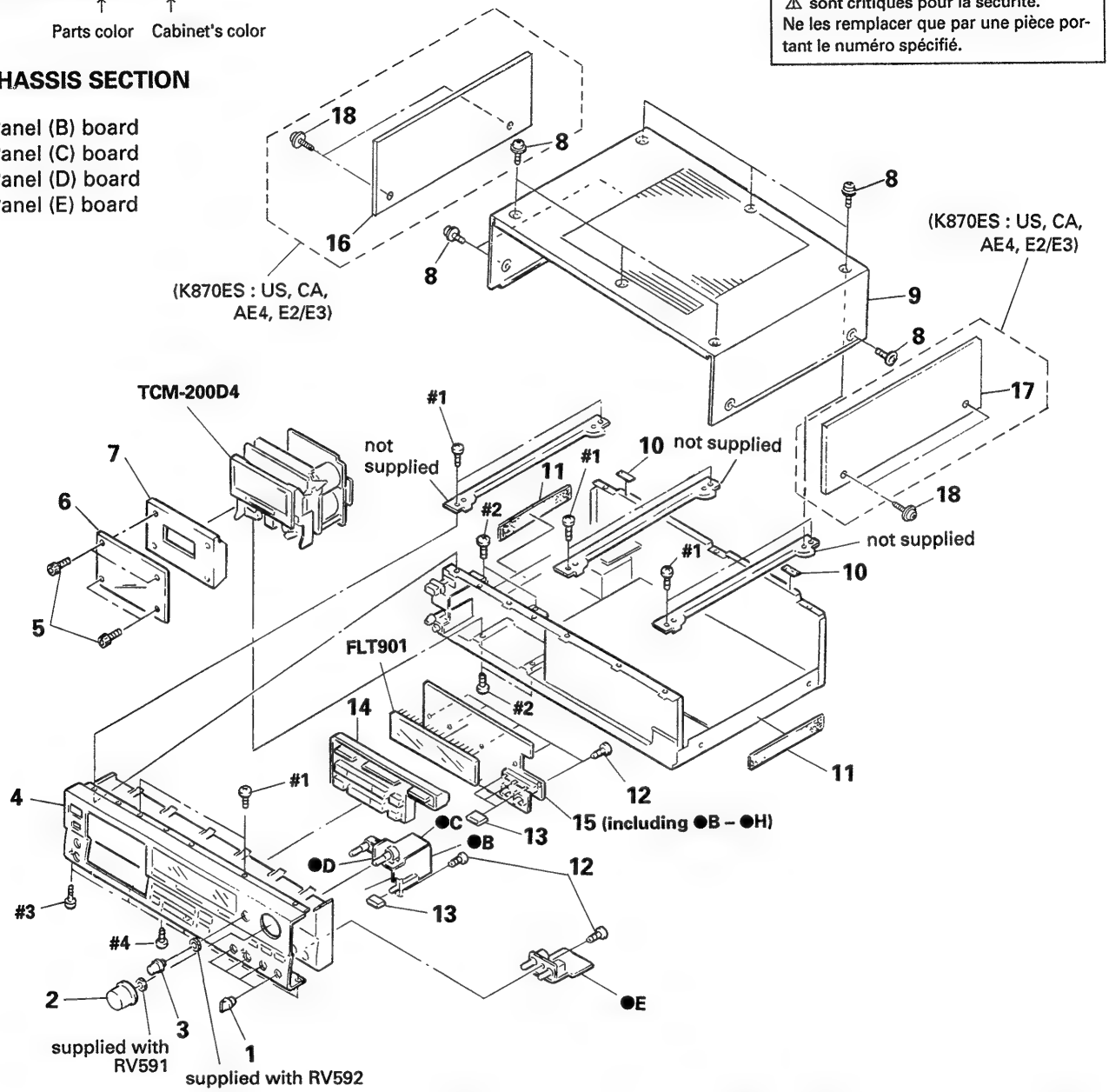
NOTE:
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB,BALANCE(WHITE)...(RED)
  ↑ ↑
  Parts color Cabinet's color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

(1) CHASSIS SECTION

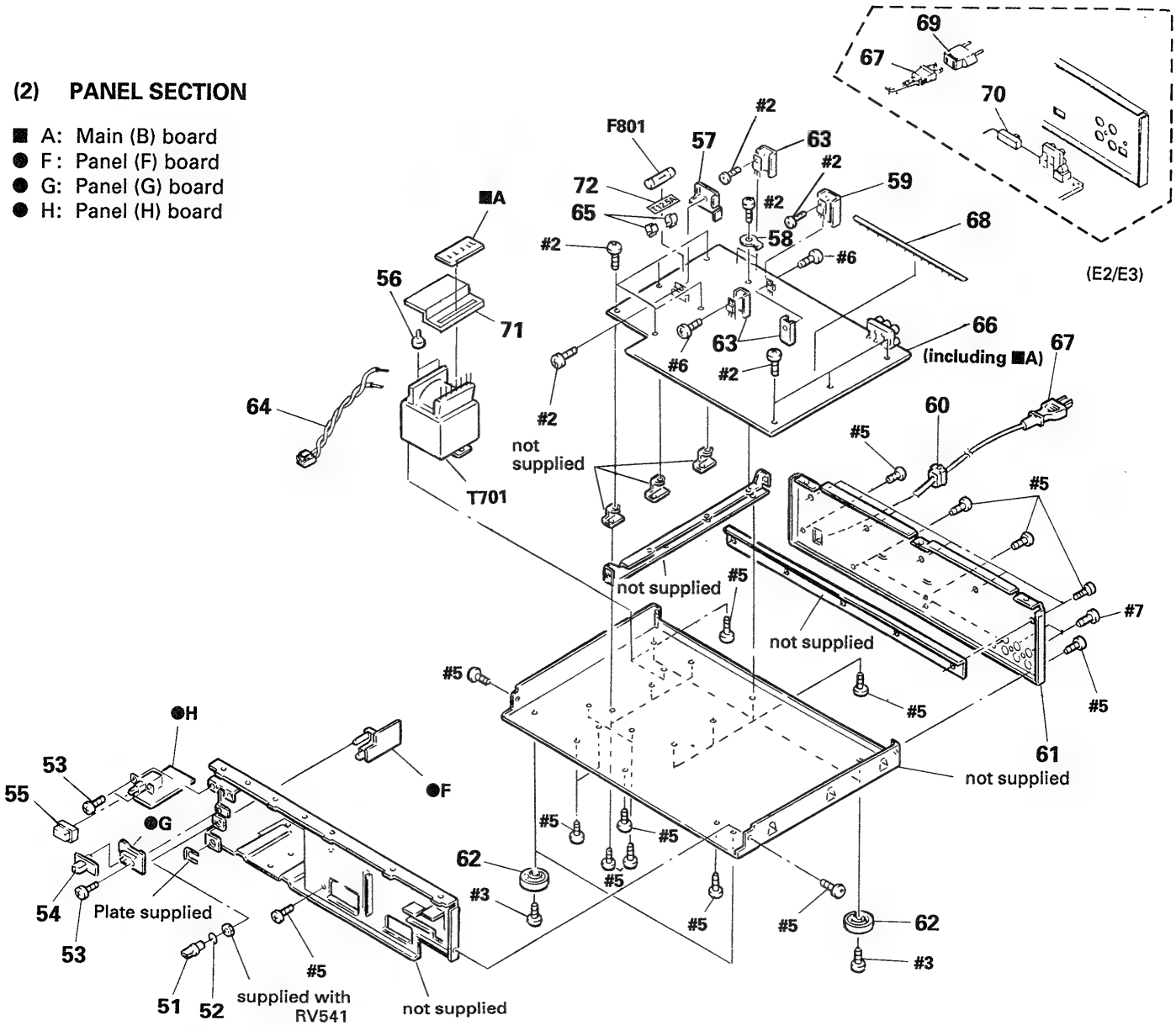
- ● B: Panel (B) board
- ● C: Panel (C) board
- ● D: Panel (D) board
- ● E: Panel (E) board



Ref. No.	Part No.	Description	Remarks
1	X-3362-818-1	KNOB (DIA. 12) ASSY (B), SQUARE	
2	X-3362-289-1	KNOB (VOL) ASSY	
3	3-364-173-01	KNOB (BAL)	
4	A-2003-813-A	PANEL ASSY, FRONT (K870ES; US, CA, UK)	
	A-2003-815-A	PANEL ASSY, FRONT (K870ES; AE4)	
	A-2003-816-A	PANEL ASSY, FRONT (K870ES; E2/E3)	
	A-2003-681-A	PANEL ASSY, FRONT (K222ESL; E2/E3)	
5	3-356-942-01	SCREW (2.6X6), TAPPING	
6	3-364-177-11	WINDOW (CASSETTE) (K870ES)	
	3-364-177-01	WINDOW (CASSETTE) (K222ESL)	
7	3-356-923-01	LID, CASSETTE	
8	3-704-366-01	SCREW (CASE) (M3X8)	
9	* 3-364-366-01	CASE	
10	3-645-258-00	CLOTH, GUIDE, C	
11	9-911-844-XX	CUSHION (50X20)	
12	4-928-635-01	SCREW, +BV (2.6X8) TAPPING	
13	3-364-165-01	BUTTON (14X5)	
14	X-3362-290-1	BUTTON (BLOCK) ASSY	
15	* A-2006-551-A	PANEL BOARD, COMPLETE	
16	X-3340-188-1	PANEL(R) ASSY, SIDE	(K870ES; US, CA, AE4, E2/E3)
17	X-3340-187-1	PANEL(L) ASSY, SIDE	(K870ES; US, CA, AE4, E2/E3)
18	4-933-446-01	SCREW (SIDE PANEL)	(K870ES; US, CA, AE4, E2/E3)

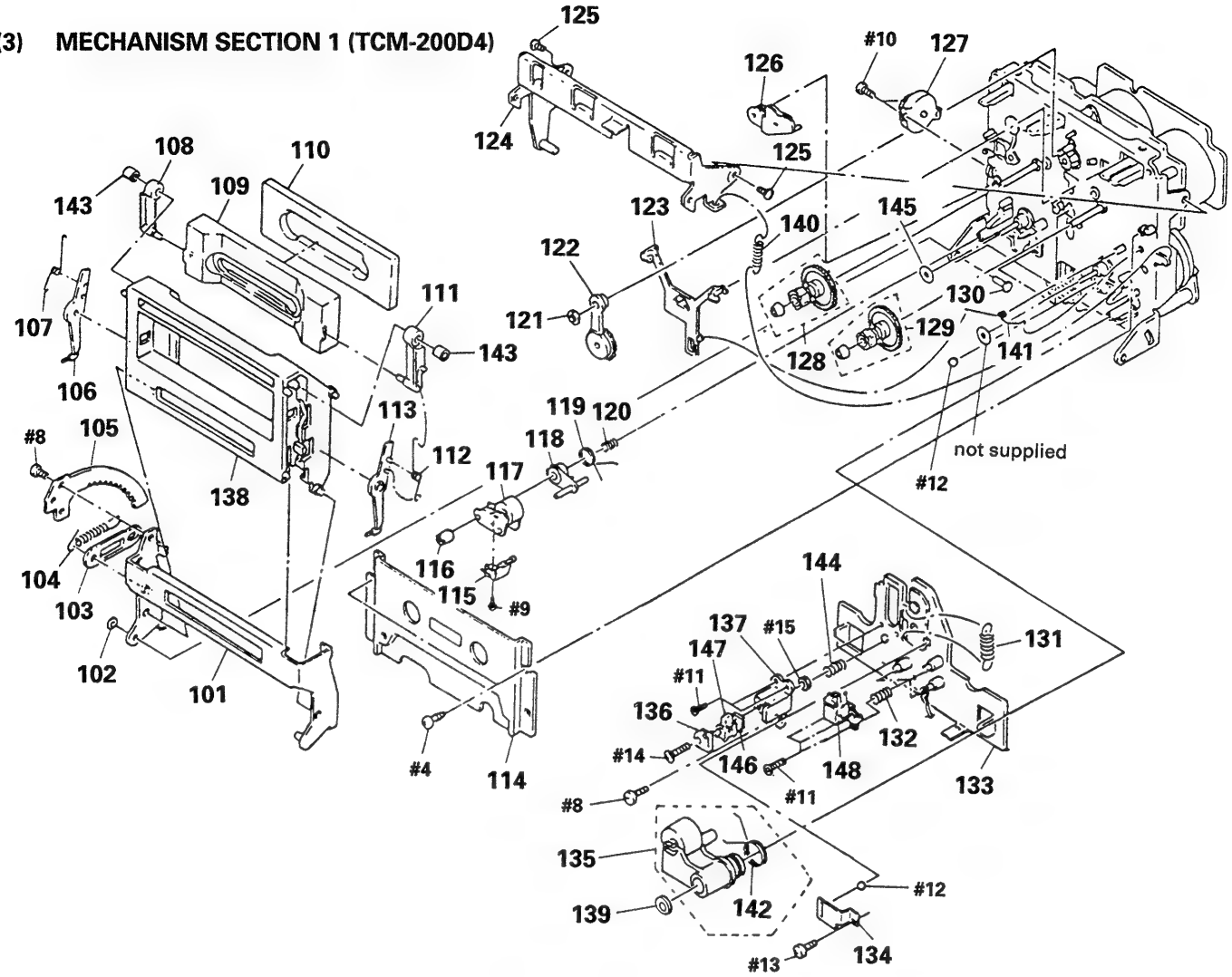
(2) PANEL SECTION

■ A: Main (B) board
● F: Panel (F) board
● G: Panel (G) board
● H: Panel (H) board



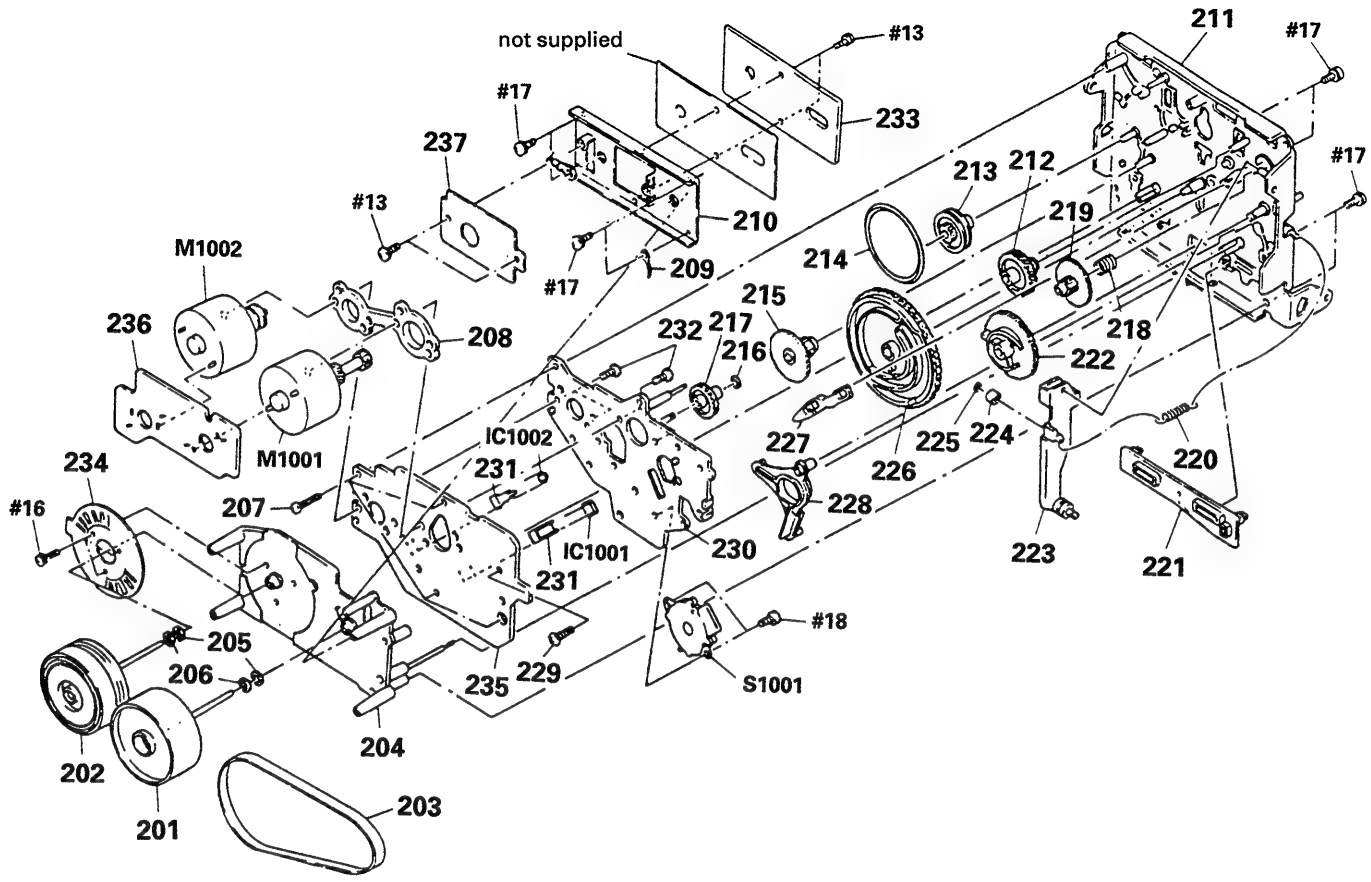
Ref. No.	Part No.	Description	Remarks
51	3-354-931-01	KNOB (DIA. 10)	
52	3-354-981-01	SPRING (SUS), RING	
53	4-928-635-01	SCREW, +BV (2.6X8) TAPPING	
54	4-922-518-01	KNOB (TIMER)	
55	3-354-912-01	KNOB, POWER	
56	* 4-912-962-01	COVER (1P), TERMINAL	(K870ES; US, CA, UK, AE4)
57	* 3-356-925-01	HEAT SINK	
58	4-870-539-00	PLATE, GROUND	
59	4-902-345-01	HEAT SINK	
60	* 3-703-244-00	BUSHING (2104), CORD	(K870ES; US, CA, UK, AE4)
	* 3-703-571-11	BUSHING (S) (4516), CORD (E2/E3)	
61	* 3-362-485-11	PANEL, BACK (K870ES; US, CA)	
	* 3-362-485-21	PANEL, BACK (K870ES; UK)	
	* 3-362-485-31	PANEL, BACK (K870ES; AE4)	
	* 3-362-485-61	PANEL, BACK (K870ES; E2/E3)	
	* 3-362-485-71	PANEL, BACK (K222ESL; E2/E3)	
62	X-3304-944-1	FOOT ASSY	
63	* 4-880-403-21	HEAT SINK	
64	* 1-590-321-51	LEAD (WITH CONNECTOR)	
65	* 1-533-213-31	HOLDER, FUSE	
66	* A-2006-507-A	MAIN BOARD, COMPLETE	(K870ES; US, CA, E2/E3 K222ESL; E2/E3)
	* A-2006-552-A	MAIN BOARD, COMPLET1 (K870E1; UK, AE4)	
67	⚠ 1-575-975-11	CORD, POWER (K870ES; US, CA)	
	⚠ 1-575-651-11	CORD, POWER (K870ES; AE4)	
	⚠ 1-575-652-11	CORD, POWER (K870ES; UK)	
	⚠ 1-575-653-11	CORD, POWER (E2/E3)	
68	* 1-560-242-91	BUS BAR 10P	
69	1-569-007-11	ADAPTER, CONVERSION 2P (K222ESL; E2/E3)	
70	1-570-307-11	SWITCH, VOLTAG CHANGE (E2/E3)	
71	* 3-356-961-02	COVER (TRANSFORMER) (E2/E3)	
72	3-701-947-12	LABEL (T1.25A), FUSE	(K870ES; UK, AE4, E2/E3 K222ESL; E2/E3)
F801	⚠ 1-532-741-11	FUSE, GLASS TUBE (1.25A)	(K870ES; US, CA)
	⚠ 1-532-285-11	FUSE, TIME-LAG (1.25A)	(K870ES; UK, AE4, E2/E3 K222ESL; E2/E3)
T701	⚠ 1-450-511-11	TRANSFORMER, POWER (K870ES; US, CA)	
	⚠ 1-450-512-11	TRANSFORMER, POWER (K870ES; UK, AE4)	
	⚠ 1-450-513-11	TRANSFORMER, POWER (E2/E3)	

(3) MECHANISM SECTION 1 (TCM-200D4)



Ref. No.	Part No.	Description	Remarks
101	X-3362-671-1	HOLDER (BG) ASSY, CASSETTE	
102	3-558-708-11	WASHER, STOPPER	
103	* 3-356-717-01	LEVER (JOINT)	
104	3-356-626-01	SPRING, TENSION	
105	3-356-708-01	GEAR (S), EJECT	
106	3-356-932-01	LEVER (LA)	
107	3-356-927-01	SPRING (LEFT), TORSION	
108	3-356-933-01	LEVER (LB)	
109	3-356-928-01	PLATE (A), ORNAMENTAL	
110	* 3-356-929-01	ABSORBENT, VIBRATION	
111	3-356-931-01	LEVER (RB)	
112	3-356-926-01	SPRING (RIGHT), TORSION	
113	3-356-930-01	LEVER (RA)	
114	X-3356-613-1	PLATE ASSY, ORNAMENTAL	
115	3-564-138-00	GUIDE (S), TAPE	
116	3-356-652-01	NUT (PINCH LEVER S)	
117	X-3356-621-1	LEVER (PINCH LEVER S) ASSY	
118	3-356-660-01	LEVER (PS)	
119	3-356-661-01	SPRING (PINCH LEVER S), TORSION	
120	3-356-657-01	SPRING (PS), COMPRESSION	
121	3-669-465-00	WASHER (1.5), STOPPER	
122	X-3356-641-1	LEVER (FR2) ASSY	
123	3-356-614-01	SLIDER (BRAKE)	
124	* X-3356-608-1	LEVER (LIFTER) ASSY	
125	3-356-601-11	SCREW, STEP	
126	X-3356-623-1	LEVER (BT) ASSY	
127	3-319-224-31	DAMPER, SMALL	
128	X-3356-629-1	GEAR (S) ASSY	
129	X-3356-627-1	GEAR (T) ASSY	
130	3-356-710-01	SHAFT (LEFT) (CASSETTE HOLDER)	
131	3-356-658-01	SPRING (LIMITER H), TENSION	
132	3-356-659-01	SPRING (RPH), COMPRESSION	
133	* X-3362-199-1	SLIDER (HEAD CHASSIS D) ASSY	
134	3-356-656-01	SPRING (HEAD PC BOARD), LEAF	
135	X-3356-620-1	LEVER (PINCH LEVER T) ASSY	
136	3-318-433-01	SPRING	
137	* 3-576-977-00	BRACKET, E. HEAD	
138	X-3356-611-1	HOLDER (A) ASSY, CASSETTE	
139	3-669-596-00	WASHER (2.3), STOPPER	
140	3-356-624-01	SPRING, TENSION	
141	3-356-619-01	SPRING (B), TORSION	
142	3-356-672-01	SPRING (PINCH LEVER T), TORSION	
143	3-356-946-01	BUSHING	
144	3-564-121-00	SPRING, COMPRESSION	
145	3-356-713-01	WASHER	
146	* 1-608-268-00	PC BOARD, ERASE HEAD	
147	1-543-358-11	HEAD, MAGNETIC (ERASE)	
148	1-543-684-11	HEAD, MAGNETIC (REC/PB)	

(4) MECHANISM SECTION 2 (TCM-200D4)



Ref. No.	Part No.	Description	Remarks
201	X-3362-284-1	FLYWHEEL (S2.3) ASSY	
202	X-3356-619-1	FLYWHEEL (DT) ASSY	
203	3-364-600-01	BELT (CAPSTAN)	
204	X-3362-281-1	CHASSIS (D2.3) ASSY	
205	3-356-705-31	WASHER (CAPSTAN)	
206	3-356-705-21	WASHER (CAPSTAN)	
207	3-355-801-01	SCREW (BTP 2X18)	
208	* 3-356-628-01	SPACER (MOTOR)	
209	* 3-701-822-00	HOLDER, WIRE	
210	* X-3362-282-1	BRACKET (THRUST RETAINER) ASSY	
211	X-3356-622-1	CHASSIS (C) ASSY, MECHANICAL	
212	3-356-703-01	GEAR (COMMUNICATION C)	
213	3-356-607-01	PULLEY (MODE)	
214	3-356-603-01	BELT (MODE)	
215	3-356-606-01	GEAR (MODE)	
216	3-669-465-00	WASHER (1.5), STOPPER	
217	3-356-702-01	GEAR (COMMUNICATION B)	
218	3-356-605-01	SPRING, COMPRESSION	
219	3-356-609-01	GEAR (LOADING)	
220	3-356-625-01	SPRING, TENSION	

Ref. No.	Part No.	Description	Remarks
221	3-356-653-01	SLIDER (PAUSE)	
222	3-356-616-01	GEAR (LOADING CAM)	
223	* X-3356-606-1	LEVER (LOADING) ASSY	
224	3-356-630-01	ROLLER (LOADING)	
225	3-558-708-21	WASHER, STOPPER	
226	3-356-654-01	GEAR (MODE CAM C)	
227	3-356-617-01	LEVER (SELECTION)	
228	3-356-613-01	LEVER (MODE)	
229	3-356-707-01	SCREW (+PTPWH 2X25)	
230	* X-3356-616-4	BRACKET (MOTOR D) ASSY	
231	3-356-631-01	HOLDER (SENSOR)	
232	3-363-804-01	SCREW (+P 2.6X6.5)	
233	A-2006-154-A	CAPSTAN C.O.C BOARD, COMPLETE	
234	1-632-779-11	PC BOARD, FG	
235	* 1-632-740-11	MD BOARD	
236	* 1-632-741-11	REAL MOTOR BOARD	
237	* 1-632-746-11	COMPARATOR BOARD	
M1001	X-3356-638-1	MOTOR (REEL R) ASSY	
M1002	X-3356-604-1	MOTOR (ASSIST) ASSY	
S1001	1-466-238-11	ENCODER, ROTARY	

SECTION 8
ELECTRICAL PARTS LIST

CAPSTAN C.O.C

COMPARATOR

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- –XX, –X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms
  METAL : Metal-film resistor
  METAL OXIDE : Metal Oxide-film resistor
  F : nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : μ, for example :
  uA...: μA..., uPA...: μPA...,
  uPB...: μPB..., uPC...: μPC...,
  uPD...: μPD...
- CAPACITORS
  uF :μF
- COILS
  uH : μH

Ref. No.	Part No.	Description			Remarks
	A-2006-154-A	CAPSTAN C.O.C BOARD, COMPLETE			
		**********			
		〈 CAPACITOR 〉			
C905	1-124-779-00	ELECT CHIP	10uF	20% 16v	
C906	1-135-091-00	TANTALUM CHIP	1uF	20% 16V	
C907	1-163-077-00	CERAMIC CHIP	0.1uF	10% 25V	
C908	1-163-077-00	CERAMIC CHIP	0.1uF	10% 25V	
C909	1-163-077-00	CERAMIC CHIP	0.1uF	10% 25V	
C910	1-163-205-00	CERAMIC CHIP	0.001uF	5% 50V	
C911	1-124-779-00	ELECT CHIP	10uF	20% 16v	
		〈 HOLE ELEMENT 〉			
H901	8-719-403-79	OH009-TW			
H902	8-719-403-79	OH009-TW			
H903	8-719-403-79	OH009-TW			
		〈 IC 〉			
IC902	8-752-017-40	IC CX20174-T1			
		〈 RESISTOR 〉			
R907	1-216-242-00	METAL GLAZE	68K	5% 1/8W	
R908	1-216-246-00	METAL GLAZE	100K	5% 1/8W	
R909	1-216-246-00	METAL GLAZE	100K	5% 1/8W	
R910	1-216-238-00	METAL GLAZE	47K	5% 1/8W	
R911	1-216-182-00	METAL GLAZE	220	5% 1/8W	
R912	1-216-182-00	METAL GLAZE	220	5% 1/8W	
R913	1-216-150-00	METAL GLAZE	10	5% 1/8W	
R914	1-216-150-00	METAL GLAZE	10	5% 1/8W	
R915	1-216-150-00	METAL GLAZE	10	5% 1/8W	
		**********			

Ref. No.	Part No.	Description			Remarks
	* 1-632-746-11	COMPARATOR BOARD			
		**********			
		〈 CAPACITOR 〉			
C951	1-136-157-00	FILM	0.022uF	5% 50V	
C952	1-124-282-00	ELECT	22uF	20% 25V	
C953	1-124-478-11	ELECT	100uF	20% 25V	
C954	1-124-477-11	ELECT	47uF	20% 25V	
C955	1-162-203-31	CERAMIC	15PF	5% 50V	
C956	1-162-203-31	CERAMIC	15PF	5% 50V	
C957	1-136-159-00	FILM	0.033uF	5% 50V	
		〈 CONNECTOR 〉			
CN951	* 1-564-718-11	PIN, CONNECTOR (SMALL TYPE) 2P			
CN952	* 1-564-518-11	PLUG, CONNECTOR 3P			
		〈 IC 〉			
IC951	8-759-945-58	IC RC4558P			
IC952	8-759-201-58	IC TC9142P			
		〈 RESISTOR 〉			
R951	1-249-413-11	CARBON	470	5% 1/4W	
R952	1-249-413-11	CARBON	470	5% 1/4W	
R953	1-247-881-00	CARBON	120K	5% 1/4W	
R954	1-247-881-00	CARBON	120K	5% 1/4W	
R955	1-249-429-11	CARBON	10K	5% 1/4W	
R956	1-249-417-11	CARBON	1K	5% 1/4W	
R957	1-249-417-11	CARBON	1K	5% 1/4W	
R958	1-247-891-00	CARBON	330K	5% 1/4W	
R959	1-247-901-11	CARBON	820K	5% 1/4W	
R960	1-249-441-11	CARBON	100K	5% 1/4W	
		〈 CRYSTAL 〉			
X951	1-577-615-11	VIBRATOR, CRYSTAL (4.934MHz)			
		**********			

MD MAIN

Ref. No.	Part No.	Description			Remarks
*	1-632-740-11	MD BOARD			
		********			
	3-356-631-01	HOLDER (SENSOR)			
		〈 CONNECTOR 〉			
CN1001	1-506-615-11	PIN, CONNECTOR 9P			
CN1002	1-564-501-11	PIN, CONNECTOR 8P			
		〈 IC 〉			
IC1001	8-749-920-97	IC PHOTO REFLECTOR GP2S22B			
IC1002	8-749-920-97	IC PHOTO REFLECTOR GP2S22B			
		〈 RESISTOR 〉			
R1001	1-249-408-11	CARBON	180	5% 1/4W	
R1002	1-249-408-11	CARBON	180	5% 1/4W	
		〈 SWITCH 〉			
S1001	1-466-238-11	ENCODER, ROTARY			
S1002	1-570-953-11	SWITCH, PUSH (1 KEY)			
S1003	1-571-958-11	SWITCH, PUSH (1 KEY)			
S1004	1-572-126-11	SWITCH, PUSH (1 KEY)			
S1005	1-572-125-11	SWITCH, LEAF			
S1006	1-572-202-11	SWITCH, LEAF			
S1007	1-572-125-11	SWITCH, LEAF			
S1008	1-572-125-11	SWITCH, LEAF			
		〈 CONNECTOR PIN 〉			
TB1001 *	1-569-066-11	PIN, CONNECTOR 5P			
**********					
*	A-2006-507-A	MAIN BOARD, COMPLETE(K870ES; US, CA, E2/E3			
		********** K222ESL; E2/E3)			
*	A-2006-552-A	MAIN BOARD, COMPLETE (K870ES; UK, AE4)			
		**********			
*	1-533-213-31	HOLDER, FUSE			
*	1-533-213-31	HOLDER, FUSE			
*	1-560-242-91	BUS BAR 10P			
	4-902-345-01	HEAT SINK (K870ES; US, CA, E2/E3)			
	4-870-273-00	HEAT SINK (E) (K870ES; UK, AE4)			
*	3-309-144-21	HEAT SINK			
*	3-356-925-01	HEAT SINK			
	4-870-539-00	PLATE, GROUND			
*	4-880-403-11	HEAT SINK			
		〈 CAPACITOR 〉			
C102	1-124-122-11	ELECT	100uF	20% 50V	
C103	1-130-893-00	FILM	0.027uF	5% 100V	
C104	1-107-169-00	MICA	100PF	5% 500V	
C105	1-136-252-00	FILM	0.0015uF	5% 100V	
C107	1-136-158-00	FILM	0.027uF	5% 50V	
C108	1-107-161-00	MICA	39PF	5% 500V	
C109	1-136-253-11	FILM	0.0018uF	5% 100V	
C110	1-136-253-11	FILM	0.0018uF	5% 100V	
C111	1-130-475-00	MYLAR	0.0022uF	5% 50V	
C112	1-130-475-00	MYLAR	0.0022uF	5% 50V	
C113	1-130-478-00	MYLAR	0.0039uF	5% 50V	
C114	1-136-173-00	FILM	0.47uF	5% 50V	
C115	1-136-167-00	FILM	0.15uF	5% 50V	
C116	1-136-155-00	FILM	0.015uF	5% 50V	
C117	1-124-903-11	ELECT	1uF	20% 50V	
C118	1-136-169-00	FILM	0.22uF	5% 50V	
C119	1-136-163-00	FILM	0.068uF	5% 50V	
C120	1-136-162-00	FILM	0.056uF	5% 50V	
C121	1-124-903-11	ELECT	1uF	20% 50V	
C122	1-130-480-00	MYLAR	0.0056uF	5% 50V	
C123	1-136-153-00	FILM	0.01uF	5% 50V	
C125	1-136-165-00	FILM	0.1uF	5% 50V	
C126	1-123-382-00	ELECT	3.3uF	20% 100V	
C171	1-123-357-00	ELECT	22uF	20% 50V	
C172	1-123-357-00	ELECT	22uF	20% 50V	
C173	1-123-357-00	ELECT	22uF	20% 50V	
C174	1-123-357-00	ELECT	22uF	20% 50V	
C202	1-124-122-11	ELECT	100uF	20% 50V	
C203	1-130-893-00	FILM	0.027uF	5% 100V	
C204	1-107-169-00	MICA	100PF	5% 500V	
C205	1-136-252-00	FILM	0.0015uF	5% 100V	
C207	1-136-158-00	FILM	0.027uF	5% 50V	
C208	1-107-161-00	MICA	39PF	5% 500V	
C209	1-136-253-11	FILM	0.0018uF	5% 100V	
C210	1-136-253-11	FILM	0.0018uF	5% 100V	
C211	1-130-475-00	MYLAR	0.0022uF	5% 50V	
C212	1-130-475-00	MYLAR	0.0022uF	5% 50V	
C213	1-130-478-00	MYLAR	0.0039uF	5% 50V	
C214	1-136-173-00	FILM	0.47uF	5% 50V	
C215	1-136-167-00	FILM	0.15uF	5% 50V	
C216	1-136-155-00	FILM	0.015uF	5% 50V	
C217	1-124-903-11	ELECT	1uF	20% 50V	
C218	1-136-169-00	FILM	0.22uF	5% 50V	
C219	1-136-163-00	FILM	0.068uF	5% 50V	
C220	1-136-162-00	FILM	0.056uF	5% 50V	
C221	1-124-903-11	ELECT	1uF	20% 50V	
C222	1-130-480-00	MYLAR	0.0056uF	5% 50V	
C223	1-136-153-00	FILM	0.01uF	5% 50V	
C225	1-124-925-11	ELECT	2.2uF	20% 100V	
C226	1-123-382-00	ELECT	3.3uF	20% 100V	
C271	1-123-357-00	ELECT	22uF	20% 50V	
C272	1-123-357-00	ELECT	22uF	20% 50V	

When indicating parts by reference number, please include the board name.

MAIN

Ref. No.	Part No.	Description				Remarks
C273	1-123-357-00	ELECT	22uF	20%	50V	
C274	1-123-357-00	ELECT	22uF	20%	50V	
C301	1-123-369-00	ELECT	4.7uF	20%	50V	
C302	1-123-369-00	ELECT	4.7uF	20%	50V	
C303	1-123-369-00	ELECT	4.7uF	20%	50V	
C304	1-130-475-00	MYLAR	0.0022uF	5%	50V	
C305	1-130-475-00	MYLAR	0.0022uF	5%	50V	
C306	1-130-478-00	MYLAR	0.0039uF	5%	50V	
C307	1-136-173-00	FILM	0.47uF	5%	50V	
C308	1-136-167-00	FILM	0.15uF	5%	50V	
C309	1-136-155-00	FILM	0.015uF	5%	50V	
C310	1-124-903-11	ELECT	1uF	20%	50V	
C311	1-136-169-00	FILM	0.22uF	5%	50V	
C312	1-136-162-00	FILM	0.056uF	5%	50V	
C313	1-124-903-11	ELECT	1uF	20%	50V	
C314	1-136-163-00	FILM	0.068uF	5%	50V	
C315	1-130-480-00	MYLAR	0.0056uF	5%	50V	
C316	1-136-153-00	FILM	0.01uF	5%	50V	
C317	1-126-059-11	ELECT	10uF	20%	50V	
C318	1-123-357-00	ELECT	22uF	20%	50V	
C319	1-130-474-00	MYLAR	0.0018uF	5%	50V	
C320	1-126-059-11	ELECT	10uF	20%	50V	
C321	1-136-163-00	FILM	0.068uF	5%	50V	
C322	1-126-059-11	ELECT	10uF	20%	50V	
C323	1-109-619-00	MICA	180PF	1%	500V	
C324	1-107-210-00	MICA	22PF	5%	500V	
C325	1-136-155-00	FILM	0.015uF	5%	50V	
C326	1-136-160-00	FILM	0.039uF	5%	50V	
C327	1-136-155-00	FILM	0.015uF	5%	50V	
C328	1-136-153-00	FILM	0.01uF	5%	50V	
C329	1-136-156-00	FILM	0.018uF	5%	50V	
C330	1-107-169-00	MICA	100PF	5%	500V	
C331	1-136-803-11	FILM	560PF	5%	630V	
C332	1-110-341-11	MYLAR	330PF	5%	50V	
C333	1-136-153-00	FILM	0.01uF	5%	50V	
C334	1-136-157-00	FILM	0.022uF	5%	50V	
C335	1-136-165-00	FILM	0.1uF	5%	50V	
C401	1-123-369-00	ELECT	4.7uF	20%	50V	
C402	1-123-369-00	ELECT	4.7uF	20%	50V	
C403	1-123-369-00	ELECT	4.7uF	20%	50V	
C404	1-130-475-00	MYLAR	0.0022uF	5%	50V	
C405	1-130-475-00	MYLAR	0.0022uF	5%	50V	
C406	1-130-478-00	MYLAR	0.0039uF	5%	50V	
C407	1-136-173-00	FILM	0.47uF	5%	50V	
C408	1-136-167-00	FILM	0.15uF	5%	50V	
C409	1-136-155-00	FILM	0.015uF	5%	50V	
C410	1-124-903-11	ELECT	1uF	20%	50V	
C411	1-136-169-00	FILM	0.22uF	5%	50V	
C412	1-136-162-00	FILM	0.056uF	5%	50V	
C413	1-124-903-11	ELECT	1uF	20%	50V	
C414	1-136-163-00	FILM	0.068uF	5%	50V	
C415	1-130-480-00	MYLAR	0.0056uF	5%	50V	
C416	1-136-153-00	FILM	0.01uF	5%	50V	
C417	1-126-059-11	ELECT	10uF	20%	50V	
C418	1-123-357-00	ELECT	22uF	20%	50V	
C419	1-130-474-00	MYLAR	0.0018uF	5%	50V	
C420	1-126-059-11	ELECT	10uF	20%	50V	
C421	1-136-163-00	FILM	0.068uF	5%	50V	
C422	1-126-059-11	ELECT	10uF	20%	50V	
C423	1-109-619-00	MICA	180PF	1%	500V	
C424	1-107-210-00	MICA	22PF	5%	500V	
C425	1-136-155-00	FILM	0.015uF	5%	50V	
C426	1-136-160-00	FILM	0.039uF	5%	50V	
C427	1-136-155-00	FILM	0.015uF	5%	50V	
C428	1-136-153-00	FILM	0.01uF	5%	50V	
C429	1-136-156-00	FILM	0.018uF	5%	50V	
C430	1-107-169-00	MICA	100PF	5%	500V	
C431	1-136-803-11	FILM	560PF	5%	630V	
C432	1-110-341-11	MYLAR	330PF	5%	50V	
C433	1-136-153-00	FILM	0.01uF	5%	50V	
C434	1-136-157-00	FILM	0.022uF	5%	50V	
C435	1-136-165-00	FILM	0.1uF	5%	50V	
C501	1-130-475-00	MYLAR	0.0022uF	5%	50V	
C502	1-136-165-00	FILM	0.1uF	5%	50V	
C503	1-124-902-00	ELECT	0.47uF	20%	50V	
C505	1-124-907-11	ELECT	10uF	20%	50V	
C506	1-124-925-11	ELECT	2.2uF	20%	100V	
C507	1-124-925-11	ELECT	2.2uF	20%	100V	
C508	1-124-477-11	ELECT	47uF	20%	25V	
C551	1-136-157-00	FILM	0.022uF	5%	50V	
C552	1-136-157-00	FILM	0.022uF	5%	50V	
C553	1-130-474-00	MYLAR	0.0018uF	5%	50V	
C554	1-130-474-00	MYLAR	0.0018uF	5%	50V	
C555	1-124-925-11	ELECT	2.2uF	20%	100V	
C556	1-136-228-11	FILM	0.0012uF	5%	100V	
C557	1-136-233-11	FILM	0.0047uF	5%	100V	
C558	1-136-228-11	FILM	0.0012uF	5%	100V	
C559	1-124-907-11	ELECT	10uF	20%	50V	
C560	1-124-925-11	ELECT	2.2uF	20%	100V	
C561	1-136-559-11	FILM	0.0047uF	5%	630V	
C562	1-124-907-11	ELECT	10uF	20%	50V	
C563	1-107-045-00	MICA	3.9PF		500V	
C564	1-126-059-11	ELECT	10uF	20%	50V	
C565	1-124-477-11	ELECT	47uF	20%	25V	
C589	1-136-161-00	FILM	0.047uF	5%	50V	
C591	1-162-282-31	CERAMIC	100PF	10%	50V	
C598	1-161-494-00	CERAMIC	0.022uF		25V	
C601	1-126-982-11	ELECT	5600uF	20%	0	
C602	1-126-982-11	ELECT	5600uF	20%	0	
C603	1-124-922-11	ELECT	1000uF	20%	63V	

When indicating parts by reference number, please include the board name.

MAIN

Ref. No.	Part No.	Description				Remarks
C604	1-124-922-11	ELECT	1000uF	20%	63V	
C605	1-136-161-00	FILM	0.047uF	5%	50V	
C606	1-136-177-00	FILM	1uF	5%	50V	
C607	1-124-122-11	ELECT	100uF	20%	50V	
C701	1-124-887-00	ELECT	3300uF	20%	16V	
C702	1-124-471-00	ELECT	1000uF	20%	6.3V	
C703	1-124-927-11	ELECT	4.7uF	20%	100V	
C704	1-126-105-11	ELECT	1000uF	20%	35V	
C705	1-124-473-11	ELECT	1000uF	20%	10V	
C706	1-124-927-11	ELECT	4.7uF	20%	100V	
C707	1-124-927-11	ELECT	4.7uF	20%	100V	
C708	1-126-955-11	ELECT	4700uF	20%	35V	
C709	1-124-556-11	ELECT	2200uF	20%	16V	
C710	1-124-927-11	ELECT	4.7uF	20%	100V	
C711	1-124-122-11	ELECT	100uF	20%	50V	
C712	1-124-477-11	ELECT	47uF	20%	25V	
C713	1-164-159-11	CERAMIC	0.1uF		50V	
C714	1-124-927-11	ELECT	4.7uF	20%	100V	
C801	1-124-443-00	ELECT	100uF	20%	10V	
C802	1-124-472-11	ELECT	470uF	20%	10V	
C803	1-124-477-11	ELECT	47uF	20%	25V	
C804	1-124-927-11	ELECT	4.7uF	20%	100V	
C805	1-126-059-11	ELECT	10uF	20%	50V	
C806	1-164-159-11	CERAMIC	0.1uF		50V	
C807	1-164-159-11	CERAMIC	0.1uF		50V	
		〈 CONNECTOR 〉				
CN501	* 1-560-062-00	PIN, CONNECTOR 4P				
CN502	* 1-564-666-11	PIN, CONNECTOR 10P				
CN503	* 1-560-063-00	PIN, CONNECTOR 5P				
CN551	* 1-564-510-11	PLUG, CONNECTOR 7P				
CN553	* 1-564-507-11	PLUG, CONNECTOR 4P				
CN555	* 1-564-509-11	PLUG, CONNECTOR 6P				
CN556	* 1-560-062-00	PIN, CONNECTOR 4P				
CN557	* 1-560-061-00	PIN, CONNECTOR 3P				
CN701	* 1-564-514-11	PLUG, CONNECTOR 11P				
CN801	* 1-564-666-11	PIN, CONNECTOR 10P				
CN802	* 1-564-342-11	PIN, CONNECTOR 8P				
CN803	* 1-564-336-00	PIN, CONNECTOR 2P				
		〈 COMPOSITION CIRCUIT BLOCK 〉				
CP801	1-236-984-11	COMPOSITION CIRCUIT BLOCK				
		〈 DIODE 〉				
D101	8-719-912-20	DIODE	1SS120			
D102	8-719-000-54	DIODE	UZL-6L3			
D103	8-719-912-20	DIODE	1SS120			
D104	8-719-912-20	DIODE	1SS120			
D201	8-719-912-20	DIODE	1SS120			
D202	8-719-000-54	DIODE	UZL-6L3			
D203	8-719-912-20	DIODE	1SS120			
D204	8-719-912-20	DIODE	1SS120			
D501	8-719-912-20	DIODE	1SS120			
D502	8-719-912-20	DIODE	1SS120			
D503	8-719-912-20	DIODE	1SS120			
D504	8-719-912-20	DIODE	1SS120			
D505	8-719-912-20	DIODE	1SS120			
D506	8-719-912-20	DIODE	1SS120			
D507	8-719-912-20	DIODE	1SS120			
D508	8-719-912-20	DIODE	1SS120			
D509	8-719-912-20	DIODE	1SS120			
D551	8-719-912-20	DIODE	1SS120			
D552	8-719-912-20	DIODE	1SS120			
D553	8-719-912-20	DIODE	1SS120			
D554	8-719-912-20	DIODE	1SS120			
D555	8-719-912-20	DIODE	1SS120			
D556	8-719-912-20	DIODE	1SS120			
D601	8-719-230-02	DIODE	30DF2			
D602	8-719-230-02	DIODE	30DF2			
D603	8-719-230-02	DIODE	30DF2			
D604	8-719-230-02	DIODE	30DF2			
D605	8-719-933-41	DIODE	HZS6C3L			
D701	8-719-200-77	DIODE	10E2N			
D702	8-719-200-77	DIODE	10E2N			
D703	8-719-200-77	DIODE	10E2N			
D704	8-719-200-77	DIODE	10E2N			
D705	8-719-200-77	DIODE	10E2N			
D706	8-719-200-77	DIODE	10E2N			
D707	8-719-200-77	DIODE	10E2N			
D708	8-719-933-41	DIODE	HZS6C3L			
D712	8-719-933-41	DIODE	HZS6C3L			
D713	8-719-001-79	DIODE	UZL-12H1			
D714	8-719-015-02	DIODE	UZP-8.2BB			
D715	8-719-200-77	DIODE	10E2N			
D716	8-719-912-20	DIODE	1SS120			
D801	8-719-200-77	DIODE	10E2N			
D802	8-719-912-20	DIODE	1SS120			
D803	8-719-912-20	DIODE	1SS120			
		〈 FUSE 〉				
F801 ⚠	1-532-741-11	FUSE, GLASS TUBE (1.25A) (K870ES; US, CA)				
⚠	1-532-285-11	FUSE, TIME-LAG (1.25A) (K870ES; UK, AE4, E2/E3 K222ESL; E2/E3)				
		〈 IC 〉				
IC501	8-759-900-72	IC	NE5532P			
IC502	8-752-018-80	IC	CX20188			
IC503	8-759-630-43	IC	M4066BPK			
IC504	8-759-945-58	IC	RC4558P			
IC505	8-759-634-50	IC	M5218AL			

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

MAIN

Ref. No.	Part No.	Description		Remarks
IC506	8-759-634-50	IC	M5218AL	
IC507	8-759-634-50	IC	M5218AL	
IC551	8-759-710-59	IC	NJM4580D-D	
IC552	8-752-018-80	IC	CX20188	
IC553	8-759-710-59	IC	NJM4580D-D	
IC554	8-759-106-56	IC	uPC1297CA	
IC555	8-759-634-50	IC	M5218AL	
IC801	8-759-635-69	IC	M50964-226SP	
IC802	8-759-973-95	IC	BA6219B	
IC803	8-759-822-09	IC	LB1641	
		〈 JACK 〉		
J501	1-565-320-61	JACK, PIN 6P		
		〈 COIL 〉		
L101	1-408-927-11	INDUCTOR	18mH	
L201	1-408-927-11	INDUCTOR	18mH	
L301	1-408-920-00	INDUCTOR	4.7mH	
L302	1-408-918-11	INDUCTOR	3.3mH	
L303	1-408-916-11	INDUCTOR	2.2mH	
L304	1-408-929-00	INDUCTOR	27mH	
L305	1-410-769-31	INDUCTOR	3.3mH	
L401	1-408-920-00	INDUCTOR	4.7mH	
L402	1-408-918-11	INDUCTOR	3.3mH	
L403	1-408-916-11	INDUCTOR	2.2mH	
L404	1-408-929-00	INDUCTOR	27mH	
L405	1-410-769-31	INDUCTOR	3.3mH	
		〈 LOW PASS FILTER 〉		
LPF301	1-236-087-11	FILTER, LOW PASS		
LPF401	1-236-087-11	FILTER, LOW PASS		
		〈 PILOT LAMP 〉		
PL551	1-518-471-31	LAMP, PILOT		
PL552	1-518-471-31	LAMP, PILOT		
		〈 TRANSISTOR 〉		
Q101	8-729-217-03	TRANSISTOR	2SK170-BL	
Q102	8-729-217-03	TRANSISTOR	2SK170-BL	
Q103	8-729-375-61	TRANSISTOR	2SD756-D	
Q104	8-729-194-57	TRANSISTOR	2SC945-P	
Q105	8-729-224-62	TRANSISTOR	2SK246-GR	
Q106	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q107	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q108	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q201	8-729-217-03	TRANSISTOR	2SK170-BL	
Q202	8-729-217-03	TRANSISTOR	2SK170-BL	
Q203	8-729-375-61	TRANSISTOR	2SD756-D	
Q204	8-729-194-57	TRANSISTOR	2SC945-P	
Q205	8-729-224-62	TRANSISTOR	2SK246-GR	
Q206	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q207	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q208	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q301	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q302	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q303	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q304	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q305	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q306	8-729-900-80	TRANSISTOR	DTC114ES	
Q401	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q402	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q403	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q404	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q405	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q406	8-729-900-80	TRANSISTOR	DTC114ES	
Q501	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q502	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q503	8-729-900-89	TRANSISTOR	DTC144ES	
Q504	8-729-900-80	TRANSISTOR	DTC114ES	
Q505	8-729-900-89	TRANSISTOR	DTC144ES	
Q551	8-729-194-57	TRANSISTOR	2SC945-P	
Q552	8-729-194-57	TRANSISTOR	2SC945-P	
Q553	8-729-281-52	TRANSISTOR	2SC1815-Y	
Q554	8-729-900-80	TRANSISTOR	DTC114ES	
Q555	8-729-900-61	TRANSISTOR	DTA114ES	
Q556	8-729-900-80	TRANSISTOR	DTC114ES	
Q557	8-729-900-80	TRANSISTOR	DTC114ES	
Q558	8-729-900-80	TRANSISTOR	DTC114ES	
Q559	8-729-900-89	TRANSISTOR	DTC144ES	
Q560	8-729-900-89	TRANSISTOR	DTC144ES	
Q601	8-729-107-53	TRANSISTOR	2SC2275A-P	
Q602	8-729-190-53	TRANSISTOR	2SA985A-P	
Q603	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q604	8-729-224-62	TRANSISTOR	2SK246-GR	
Q605	8-729-141-32	TRANSISTOR	2SA1409-LK	
Q606	8-729-224-62	TRANSISTOR	2SK246-GR	
Q607	8-729-620-05	TRANSISTOR	2SC2603-EF	
Q611	8-729-119-76	TRANSISTOR	2SA1175-HFE	
Q701	8-729-111-55	TRANSISTOR	2SD1312-K	
Q702	8-729-111-55	TRANSISTOR	2SD1312-K	
Q703	8-729-111-55	TRANSISTOR	2SD1312-K	
Q704	8-729-620-05	TRANSISTOR	2SC2603-EF	
Q706	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q707	8-729-620-05	TRANSISTOR	2SC2603-EF	
Q708	8-729-922-37	TRANSISTOR	2SD2144S-UVW	
Q709	8-729-140-04	TRANSISTOR	2SB1116A-L	
Q710	8-729-141-32	TRANSISTOR	2SA1409-LK	
Q801	8-729-900-65	TRANSISTOR	DTA144ES	
Q802	8-729-900-65	TRANSISTOR	DTA144ES	

When indicating parts by reference number, please include the board name.

MAIN

Ref. No.	Part No.	Description				Remarks
Q803	8-729-900-65	TRANSISTOR	DTA144ES			
Q804	8-729-900-65	TRANSISTOR	DTA144ES			
Q805	8-729-119-76	TRANSISTOR	2SA1175-HFE			
Q806	8-729-900-65	TRANSISTOR	DTA144ES			
Q807	8-729-900-65	TRANSISTOR	DTA144ES			
Q808	8-729-119-76	TRANSISTOR	2SA1175-HFE			
Q809	8-729-900-65	TRANSISTOR	DTA144ES			
Q810	8-729-119-76	TRANSISTOR	2SA1175-HFE			
Q811	8-729-119-76	TRANSISTOR	2SA1175-HFE			
Q812	8-729-900-61	TRANSISTOR	DTA114ES			
Q813	8-729-620-05	TRANSISTOR	2SC2603-EF			
Q814	8-729-620-05	TRANSISTOR	2SC2603-EF			
		〈 RESISTOR 〉				
R101	1-249-844-11	CARBON	56K	5%	1/2W	
R102	1-247-740-11	CARBON	120	5%	1/2W	
R103	1-249-462-11	CARBON	22K	5%	1/4W	
R104	1-249-723-11	CARBON	120K	5%	1/2W	
R105	1-247-255-00	CARBON	4.3K	5%	1/2W	
R106	1-247-128-00	CARBON	750	5%	1/4W	
R107	1-247-128-00	CARBON	750	5%	1/4W	
R108	1-247-700-11	CARBON	100	5%	1/4W	
R109	1-249-542-11	CARBON	390	5%	1/4W	
R110	1-249-518-11	CARBON	39	5%	1/4W	
R111	1-247-720-11	CARBON	3.9K	5%	1/4W	
R112	1-247-704-11	CARBON	220	5%	1/4W	
R113	1-247-717-11	CARBON	2.2K	5%	1/4W	
R114	1-247-138-00	CARBON	2K	5%	1/4W	
R115	1-247-720-11	CARBON	3.9K	5%	1/4W	
R116	1-247-710-11	CARBON	560	5%	1/4W	
R117	1-247-725-11	CARBON	10K	5%	1/4W	
R118	1-247-148-00	CARBON	5.1K	5%	1/4W	
R119	1-247-718-11	CARBON	2.7K	5%	1/4W	
R120	1-246-545-00	CARBON	1.0M	5%	1/4W	
R121	1-247-710-11	CARBON	560	5%	1/4W	
R122	1-249-462-11	CARBON	22K	5%	1/4W	
R123	1-247-852-11	CARBON	7.5K	5%	1/4W	
R124	1-249-415-11	CARBON	680	5%	1/4W	
R125	1-247-854-11	CARBON	9.1K	5%	1/4W	
R126	1-249-465-11	CARBON	47K	5%	1/4W	
R127	1-249-465-11	CARBON	47K	5%	1/4W	
R128	1-249-681-11	CARBON	2.2K	5%	1/2W	
R129	1-249-673-11	CARBON	1K	5%	1/2W	
R130	1-249-461-11	CARBON	18K	5%	1/4W	
R131	1-249-421-11	CARBON	2.2K	5%	1/4W	
R132	1-249-429-11	CARBON	10K	5%	1/4W	
R133	1-249-433-11	CARBON	22K	5%	1/4W	
R134	1-249-417-11	CARBON	1K	5%	1/4W	
R135	1-249-437-11	CARBON	47K	5%	1/4W	
R136	1-249-427-11	CARBON	6.8K	5%	1/4W	

Ref. No.	Part No.	Description				Remarks
R137	1-215-444-00	METAL	9.1K	1%	1/6W	
R138	1-215-465-00	METAL	68K	1%	1/6W	
R139	1-215-448-00	METAL	13K	1%	1/6W	
R140	1-215-471-00	METAL	120K	1%	1/6W	
R141	1-249-408-11	CARBON	180	5%	1/4W	
R142	1-247-883-00	CARBON	150K	5%	1/4W	
R143	1-249-429-11	CARBON	10K	5%	1/4W	
R201	1-249-844-11	CARBON	56K	5%	1/2W	
R202	1-247-740-11	CARBON	120	5%	1/2W	
R203	1-249-462-11	CARBON	22K	5%	1/4W	
R204	1-249-723-11	CARBON	120K	5%	1/2W	
R205	1-247-255-00	CARBON	4.3K	5%	1/2W	
R206	1-247-128-00	CARBON	750	5%	1/4W	
R207	1-247-128-00	CARBON	750	5%	1/4W	
R208	1-247-700-11	CARBON	100	5%	1/4W	
R209	1-249-542-11	CARBON	390	5%	1/4W	
R210	1-249-518-11	CARBON	39	5%	1/4W	
R211	1-247-720-11	CARBON	3.9K	5%	1/4W	
R212	1-247-704-11	CARBON	220	5%	1/4W	
R213	1-247-717-11	CARBON	2.2K	5%	1/4W	
R214	1-247-138-00	CARBON	2K	5%	1/4W	
R215	1-247-720-11	CARBON	3.9K	5%	1/4W	
R216	1-247-710-11	CARBON	560	5%	1/4W	
R217	1-247-725-11	CARBON	10K	5%	1/4W	
R218	1-247-148-00	CARBON	5.1K	5%	1/4W	
R219	1-247-718-11	CARBON	2.7K	5%	1/4W	
R220	1-246-545-00	CARBON	1.0M	5%	1/4W	
R221	1-247-710-11	CARBON	560	5%	1/4W	
R222	1-249-462-11	CARBON	22K	5%	1/4W	
R223	1-247-852-11	CARBON	7.5K	5%	1/4W	
R224	1-249-415-11	CARBON	680	5%	1/4W	
R225	1-247-854-11	CARBON	9.1K	5%	1/4W	
R226	1-249-465-11	CARBON	47K	5%	1/4W	
R227	1-249-465-11	CARBON	47K	5%	1/4W	
R228	1-249-681-11	CARBON	2.2K	5%	1/2W	
R229	1-249-673-11	CARBON	1K	5%	1/2W	
R230	1-249-461-11	CARBON	18K	5%	1/4W	
R231	1-249-421-11	CARBON	2.2K	5%	1/4W	
R232	1-249-429-11	CARBON	10K	5%	1/4W	
R233	1-249-433-11	CARBON	22K	5%	1/4W	
R234	1-249-417-11	CARBON	1K	5%	1/4W	
R235	1-249-437-11	CARBON	47K	5%	1/4W	
R236	1-249-427-11	CARBON	6.8K	5%	1/4W	
R237	1-215-444-00	METAL	9.1K	1%	1/6W	
R238	1-215-465-00	METAL	68K	1%	1/6W	
R239	1-215-448-00	METAL	13K	1%	1/6W	
R240	1-215-471-00	METAL	120K	1%	1/6W	
R241	1-249-408-11	CARBON	180	5%	1/4W	
R242	1-247-883-00	CARBON	150K	5%	1/4W	
R243	1-249-429-11	CARBON	10K	5%	1/4W	

When indicating parts by reference number, please include the board name.

MAIN

Ref. No.	Part No.	Description				Remarks
R301	1-249-703-11	CARBON	18K	5%	1/2W	
R302	1-249-490-11	CARBON	27K	5%	1/2W	
R303	1-249-469-11	CARBON	100K	5%	1/4W	
R304	1-247-723-11	CARBON	6.8K	5%	1/4W	
R305	1-247-720-11	CARBON	3.9K	5%	1/4W	
R306	1-247-719-11	CARBON	3.3K	5%	1/4W	
R307	1-247-152-00	CARBON	7.5K	5%	1/4W	
R308	1-249-465-11	CARBON	47K	5%	1/4W	
R309	1-249-465-11	CARBON	47K	5%	1/4W	
R310	1-249-543-11	CARBON	430	5%	1/4W	
R311	1-247-725-11	CARBON	10K	5%	1/4W	
R312	1-247-718-11	CARBON	2.7K	5%	1/4W	
R313	1-247-148-00	CARBON	5.1K	5%	1/4W	
R314	1-246-545-00	CARBON	1.0M	5%	1/4W	
R315	1-247-710-11	CARBON	560	5%	1/4W	
R316	1-249-462-11	CARBON	22K	5%	1/4W	
R317	1-247-854-11	CARBON	9.1K	5%	1/4W	
R318	1-247-852-11	CARBON	7.5K	5%	1/4W	
R319	1-249-415-11	CARBON	680	5%	1/4W	
R320	1-249-462-11	CARBON	22K	5%	1/4W	
R321	1-247-719-11	CARBON	3.3K	5%	1/4W	
R322	1-247-723-11	CARBON	6.8K	5%	1/4W	
R323	1-249-497-11	CARBON	33K	5%	1/4W	
R324	1-249-465-11	CARBON	47K	5%	1/4W	
R325	1-249-556-11	CARBON	1.5K	5%	1/4W	
R326	1-249-598-11	CARBON	82K	5%	1/4W	
R327	1-259-467-11	CARBON	43K	5%	1/4W	
R328	1-247-718-11	CARBON	2.7K	5%	1/4W	
R329	1-247-702-11	CARBON	150	5%	1/4W	
R330	1-249-462-11	CARBON	22K	5%	1/4W	
R331	1-247-722-11	CARBON	5.6K	5%	1/4W	
R332	1-247-701-11	CARBON	120	5%	1/4W	
R333	1-247-725-11	CARBON	10K	5%	1/4W	
R334	1-247-721-11	CARBON	4.7K	5%	1/4W	
R335	1-247-700-11	CARBON	100	5%	1/4W	
R336	1-249-429-11	CARBON	10K	5%	1/4W	
R337	1-249-429-11	CARBON	10K	5%	1/4W	
R338	1-249-429-11	CARBON	10K	5%	1/4W	
R339	1-249-429-11	CARBON	10K	5%	1/4W	
R340	1-249-421-11	CARBON	2.2K	5%	1/4W	
R341	1-249-604-11	CARBON	150K	5%	1/4W	
R342 ⚠	1-212-857-00	FUSIBLE	10	5%	1/4W	F
R343	1-249-439-11	CARBON	68K	5%	1/4W	
R344	1-249-426-11	CARBON	5.6K	5%	1/4W	
R401	1-249-703-11	CARBON	18K	5%	1/2W	
R402	1-249-490-11	CARBON	27K	5%	1/2W	
R403	1-249-469-11	CARBON	100K	5%	1/4W	
R404	1-247-723-11	CARBON	6.8K	5%	1/4W	
R405	1-247-720-11	CARBON	3.9K	5%	1/4W	
R406	1-247-719-11	CARBON	3.3K	5%	1/4W	
R407	1-247-152-00	CARBON	7.5K	5%	1/4W	
R408	1-249-465-11	CARBON	47K	5%	1/4W	
R409	1-249-465-11	CARBON	47K	5%	1/4W	
R410	1-249-543-11	CARBON	430	5%	1/4W	
R411	1-247-725-11	CARBON	10K	5%	1/4W	
R412	1-247-718-11	CARBON	2.7K	5%	1/4W	
R413	1-247-148-00	CARBON	5.1K	5%	1/4W	
R414	1-246-545-00	CARBON	1.0M	5%	1/4W	
R415	1-247-710-11	CARBON	560	5%	1/4W	
R416	1-249-462-11	CARBON	22K	5%	1/4W	
R417	1-247-854-11	CARBON	9.1K	5%	1/4W	
R418	1-247-852-11	CARBON	7.5K	5%	1/4W	
R419	1-249-415-11	CARBON	680	5%	1/4W	
R420	1-249-462-11	CARBON	22K	5%	1/4W	
R421	1-247-719-11	CARBON	3.3K	5%	1/4W	
R422	1-247-723-11	CARBON	6.8K	5%	1/4W	
R423	1-249-497-11	CARBON	33K	5%	1/4W	
R424	1-249-465-11	CARBON	47K	5%	1/4W	
R425	1-249-556-11	CARBON	1.5K	5%	1/4W	
R426	1-249-598-11	CARBON	82K	5%	1/4W	
R427	1-259-467-11	CARBON	43K	5%	1/4W	
R428	1-247-718-11	CARBON	2.7K	5%	1/4W	
R429	1-247-702-11	CARBON	150	5%	1/4W	
R430	1-249-462-11	CARBON	22K	5%	1/4W	
R431	1-247-722-11	CARBON	5.6K	5%	1/4W	
R432	1-247-701-11	CARBON	120	5%	1/4W	
R433	1-247-725-11	CARBON	10K	5%	1/4W	
R434	1-247-721-11	CARBON	4.7K	5%	1/4W	
R435	1-247-700-11	CARBON	100	5%	1/4W	
R436	1-249-429-11	CARBON	10K	5%	1/4W	
R437	1-249-429-11	CARBON	10K	5%	1/4W	
R438	1-249-429-11	CARBON	10K	5%	1/4W	
R439	1-249-429-11	CARBON	10K	5%	1/4W	
R440	1-249-421-11	CARBON	2.2K	5%	1/4W	
R441	1-249-604-11	CARBON	150K	5%	1/4W	
R442 ⚠	1-212-857-00	FUSIBLE	10	5%	1/4W	F
R443	1-249-439-11	CARBON	68K	5%	1/4W	
R444	1-249-426-11	CARBON	5.6K	5%	1/4W	
R501	1-249-433-11	CARBON	22K	5%	1/4W	
R502	1-249-433-11	CARBON	22K	5%	1/4W	
R503	1-249-469-11	CARBON	100K	5%	1/4W	
R504	1-249-465-11	CARBON	47K	5%	1/4W	
R505	1-215-472-00	METAL	130K	1%	1/6W	
R506	1-249-437-11	CARBON	47K	5%	1/4W	
R507	1-249-433-11	CARBON	22K	5%	1/4W	
R508	1-249-417-11	CARBON	1K	5%	1/4W	
R509	1-247-885-00	CARBON	180K	5%	1/4W	
R510	1-249-433-11	CARBON	22K	5%	1/4W	
R511	1-249-413-11	CARBON	470	5%	1/4W	
R512	1-249-413-11	CARBON	470	5%	1/4W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

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Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

MAIN

Ref. No.	Part No.	Description				Remarks
R513	1-249-432-11	CARBON	18K	5%	1/4W	
R514	1-249-433-11	CARBON	22K	5%	1/4W	
R515	1-249-437-11	CARBON	47K	5%	1/4W	
R516	1-249-437-11	CARBON	47K	5%	1/4W	
R517	1-249-437-11	CARBON	47K	5%	1/4W	
R518	1-249-429-11	CARBON	10K	5%	1/4W	
R519	1-249-429-11	CARBON	10K	5%	1/4W	
R520	1-249-437-11	CARBON	47K	5%	1/4W	
R521	1-249-429-11	CARBON	10K	5%	1/4W	
R522	1-249-437-11	CARBON	47K	5%	1/4W	
R523	1-249-421-11	CARBON	2.2K	5%	1/4W	
R550	1-215-472-00	METAL	130K	1%	1/6W	
R551	1-249-432-11	CARBON	18K	5%	1/4W	
R552	1-249-433-11	CARBON	22K	5%	1/4W	
R553	1-249-406-11	CARBON	120	5%	1/4W	
R554	1-249-432-11	CARBON	18K	5%	1/4W	
R555	1-249-397-11	CARBON	22	5%	1/4W	
R556	1-247-856-00	CARBON	11K	5%	1/4W	
R557	1-249-429-11	CARBON	10K	5%	1/4W	
R558	1-249-406-11	CARBON	120	5%	1/4W	
R559	1-247-856-00	CARBON	11K	5%	1/4W	
R560	1-249-397-11	CARBON	22	5%	1/4W	
R561	1-247-887-00	CARBON	220K	5%	1/4W	
R562	1-247-887-00	CARBON	220K	5%	1/4W	
R563	1-249-407-11	CARBON	150	5%	1/4W	
R564	1-249-437-11	CARBON	47K	5%	1/4W	
R565	1-249-441-11	CARBON	100K	5%	1/4W	
R566	1-249-421-11	CARBON	2.2K	5%	1/4W	
R567	1-249-440-11	CARBON	82K	5%	1/4W	
R568	1-249-440-11	CARBON	82K	5%	1/4W	
R569 ⚠	1-212-853-00	FUSIBLE	6.8	5%	1/4W	F
R570 ⚠	1-212-853-00	FUSIBLE	6.8	5%	1/4W	F
R571	1-249-427-11	CARBON	6.8K	5%	1/4W	
R572	1-249-381-11	CARBON	1	5%	1/4W	
R573	1-249-421-11	CARBON	2.2K	5%	1/4W	
R574	1-249-417-11	CARBON	1K	5%	1/4W	
R575	1-249-433-11	CARBON	22K	5%	1/4W	
R576	1-249-414-11	CARBON	560	5%	1/4W	
R577	1-247-830-11	CARBON	910	5%	1/4W	
R578	1-249-425-11	CARBON	4.7K	5%	1/4W	
R601 ⚠	1-212-863-00	FUSIBLE	18	5%	1/4W	F
R603	1-247-717-11	CARBON	2.2K	5%	1/4W	
R604	1-247-717-11	CARBON	2.2K	5%	1/4W	
R605	1-247-706-11	CARBON	330	5%	1/4W	
R606	1-249-556-11	CARBON	1.5K	5%	1/4W	
R607	1-249-556-11	CARBON	1.5K	5%	1/4W	
R608	1-249-926-11	CARBON	1.3K	5%	1/4W	
R609	1-247-717-11	CARBON	2.2K	5%	1/4W	
R611	1-247-704-11	CARBON	220	5%	1/4W	
R612	1-247-704-11	CARBON	220	5%	1/4W	
R701	1-249-421-11	CARBON	2.2K	5%	1/4W	
R702	1-249-421-11	CARBON	2.2K	5%	1/4W	
R703	1-249-421-11	CARBON	2.2K	5%	1/4W	
R704	1-249-425-11	CARBON	4.7K	5%	1/4W	
R706	1-249-425-11	CARBON	4.7K	5%	1/4W	
R707	1-249-421-11	CARBON	2.2K	5%	1/4W	
R708	1-249-421-11	CARBON	2.2K	5%	1/4W	
R709	1-249-427-11	CARBON	6.8K	5%	1/4W	
R710	1-249-425-11	CARBON	4.7K	5%	1/4W	
R711	1-249-431-11	CARBON	15K	5%	1/4W	
R712	1-249-429-11	CARBON	10K	5%	1/4W	
R713	1-249-441-11	CARBON	100K	5%	1/4W	
R714	1-249-425-11	CARBON	4.7K	5%	1/4W	
R715	1-247-752-11	CARBON	1K	5%	1/2W	
R801	1-249-429-11	CARBON	10K	5%	1/4W	
R802	1-249-429-11	CARBON	10K	5%	1/4W	
R803	1-249-440-11	CARBON	82K	5%	1/4W	
R804	1-249-429-11	CARBON	10K	5%	1/4W	
R805	1-249-429-11	CARBON	10K	5%	1/4W	
R806	1-249-429-11	CARBON	10K	5%	1/4W	
R807	1-249-429-11	CARBON	10K	5%	1/4W	
R808	1-249-421-11	CARBON	2.2K	5%	1/4W	
R809	1-249-421-11	CARBON	2.2K	5%	1/4W	
R810	1-249-429-11	CARBON	10K	5%	1/4W	
R811	1-249-435-11	CARBON	33K	5%	1/4W	
R812	1-249-429-11	CARBON	10K	5%	1/4W	
R813	1-249-413-11	CARBON	470	5%	1/4W	
R814	1-249-436-11	CARBON	39K	5%	1/4W	
R815	1-249-436-11	CARBON	39K	5%	1/4W	
R816	1-247-903-00	CARBON	1M	5%	1/4W	
R817	1-249-425-11	CARBON	4.7K	5%	1/4W	
R818	1-249-417-11	CARBON	1K	5%	1/4W	
R819	1-249-435-11	CARBON	33K	5%	1/4W	
R820	1-249-437-11	CARBON	47K	5%	1/4W	
R821	1-249-484-11	CARBON	6.8	5%	1/2W	
R822	1-249-484-11	CARBON	6.8	5%	1/2W	
R823	1-247-854-11	CARBON	9.1K	5%	1/4W	
R824	1-249-425-11	CARBON	4.7K	5%	1/4W	
R825	1-249-425-11	CARBON	4.7K	5%	1/4W	
R826	1-249-425-11	CARBON	4.7K	5%	1/4W	
R827	1-249-425-11	CARBON	4.7K	5%	1/4W	
R828	1-249-426-11	CARBON	5.6K	5%	1/4W	
R829	1-249-429-11	CARBON	10K	5%	1/4W	
R830	1-249-429-11	CARBON	10K	5%	1/4W	
R831	1-249-427-11	CARBON	6.8K	5%	1/4W	
R832	1-249-428-11	CARBON	8.2K	5%	1/4W	
R833	1-249-429-11	CARBON	10K	5%	1/4W	
R834	1-249-429-11	CARBON	10K	5%	1/4W	
R835	1-249-413-11	CARBON	470	5%	1/4W	

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MAIN **REAL MOTOR** **PANEL**

Ref. No.	Part No.	Description	Remarks
		〈 VARIABLE RESISTOR 〉	
RV101	1-241-338-11	RES, ADJ, CARBON 200 (PB LEVEL L)	
RV102	1-238-602-11	RES, ADJ, CARBON 47K (CA METER L)	
RV201	1-241-338-11	RES, ADJ, CARBON 200 (PB LEVEL R)	
RV202	1-238-602-11	RES, ADJ, CARBON 47K (CA METER R)	
RV301	1-228-993-00	RES, ADJ, METAL 4.7K (REC LEVEL L)	
RV302	1-238-599-11	RES, ADJ, CARBON 4.7K (BIAS L CH)	
RV303	1-238-601-11	RES, ADJ, CARBON 22K (BIAS L CH)	
RV401	1-228-993-00	RES, ADJ, METAL 4.7K (REC LEVEL R)	
RV402	1-238-599-11	RES, ADJ, CARBON 4.7K (BIAS R CH)	
RV403	1-238-601-11	RES, ADJ, CARBON 22K (BIAS R CH)	
RV551	1-238-595-11	RES, ADJ, CARBON 220 (400Hz)	
RV552	1-238-595-11	RES, ADJ, CARBON 220 (8kHz)	
RV553	1-238-599-11	RES, ADJ, CARBON 4.7K (ERASE CURRENT)	
RV554	1-238-602-11	RES, ADJ, CARBON 47K (BIAS)	
RV801	1-238-599-11	RES, ADJ, CARBON 4.7K (FWD TORQUE)	
		〈 BIAS OSCILLATOR 〉	
T301	1-433-379-11	TRANSFORMER, BIAS OSCILLATOR	
T401	1-433-379-11	TRANSFORMER, BIAS OSCILLATOR	
T551	1-433-359-11	TRANSFORMER, BIAS OSCILLATION	
		〈 CONNECTOR PLUG 〉	
TP551	* 1-564-505-11	PLUG, CONNECTOR 2P	
TP552	* 1-564-506-11	PLUG, CONNECTOR 3P	
TP553	* 1-564-506-11	PLUG, CONNECTOR 3P	
TP801	* 1-564-506-11	PLUG, CONNECTOR 3P	
		〈 CRYSTAL 〉	
X801	1-577-358-21	VIBRATOR, CERAMIC (4.0MHz)	
**********			
	* 1-632-741-11	REAL MOTOR BOARD	
		**********	
		〈 CAPACITOR 〉	
C1051	1-124-907-11	ELECT 10uF 20% 50V	
C1052	1-124-907-11	ELECT 10uF 20% 50V	
C1053	1-164-159-11	CERAMIC 0.1uF 50V	
		〈 CONNECTOR 〉	
CN1051	* 1-564-499-11	PIN, CONNECTOR 6P	
CN1052	* 1-564-718-11	PIN, CONNECTOR (SMALL TYPE) 2P	
CN1053	* 1-564-718-11	PIN, CONNECTOR (SMALL TYPE) 2P	
		〈 MOTOR 〉	
M1001	X-3356-638-1	MOTOR (REEL R) ASSY	
M1002	X-3356-604-1	MOTOR (ASSIST) ASSY	

Ref. No.	Part No.	Description	Remarks
		〈 RESISTOR 〉	
R1051	1-249-412-11	CARBON 390 5% 1/4W	
**********			
	* A-2006-551-A	PANEL BOARD, COMPLETE	
		**********	
		〈 CAPACITOR 〉	
C001	1-161-744-00	CERAMIC 0.01uF 400V	
C181	1-126-059-11	ELECT 10uF 20% 50V	
C281	1-126-059-11	ELECT 10uF 20% 50V	
C341	1-130-473-00	MYLAR 0.0015uF 5% 50V	
C342	1-130-471-00	MYLAR 0.001uF 5% 50V	
C441	1-130-473-00	MYLAR 0.0015uF 5% 50V	
C442	1-130-471-00	MYLAR 0.001uF 5% 50V	
C541	1-123-369-00	ELECT 4.7uF 20% 50V	
C542	1-123-369-00	ELECT 4.7uF 20% 50V	
C597	1-162-598-11	CERAMIC 0.001uF 10% 1KV	
C901	1-126-177-11	ELECT 100uF 20% 10V	
		〈 CONNECTOR 〉	
CN001	* 1-568-226-11	PIN, CONNECTOR 2P	
CN002	1-568-226-11	PIN, CONNECTOR 2P	
CN521	* 1-564-521-11	PLUG, CONNECTOR 6P	
CN543	* 1-560-070-00	BASE POST 5P	
CN591	* 1-564-519-11	PLUG, CONNECTOR 4P	
CN592	* 1-564-519-11	PLUG, CONNECTOR 4P	
CN593	* 1-564-519-11	PLUG, CONNECTOR 4P	
CN901	* 1-564-336-00	PIN, CONNECTOR 2P	
		〈 COMPOSITION CIRCUIT BLOCK 〉	
CP901	1-232-881-11	COMPOSITION CIRCUIT BLOCK	
CP902	1-232-881-11	COMPOSITION CIRCUIT BLOCK	
CP903	1-236-985-11	COMPOSITION CIRCUIT BLOCK	
		〈 DIODE 〉	
D901	8-719-912-20	DIODE 1SS120	
D902	8-719-912-20	DIODE 1SS120	
D903	8-719-933-57	DIODE HZS9B2L	
D904	8-719-912-20	DIODE 1SS120	
D905	8-719-912-20	DIODE 1SS120	
D906	8-719-912-20	DIODE 1SS120	
D907	8-719-912-20	DIODE 1SS120	
D908	8-719-912-20	DIODE 1SS120	
D909	8-719-912-20	DIODE 1SS120	
D910	8-719-912-20	DIODE 1SS120	
D911	8-719-912-20	DIODE 1SS120	
D912	8-719-302-46	DIODE SEL1210S-C	
D913	8-719-302-45	DIODE SEL1210S-C	

When indicating parts by reference number, please include the board name.

PANEL

Ref. No.	Part No.	Description	Remarks
D914	8-719-302-79	DIODE SEL1910A-C	
		〈 INDICATOR TUBE 〉	
FLT901	1-519-560-11	INDICATOR TUBE, FLUORESCENT	
		〈 IC 〉	
IC541	8-759-634-51	IC M5218AP	
IC901	8-759-635-68	IC M50940-313SP	
IC902	8-741-100-48	IC SBX1610-59	
		〈 JACK 〉	
J541	1-507-796-71	JACK	
		〈 TRANSISTOR 〉	
Q901	8-729-115-28	TRANSISTOR 2SA1511	
Q902	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q903	8-729-900-61	TRANSISTOR DTA114ES	
Q904	8-729-900-61	TRANSISTOR DTA114ES	
Q905	8-729-900-61	TRANSISTOR DTA114ES	
Q906	8-729-900-61	TRANSISTOR DTA114ES	
Q907	8-729-900-65	TRANSISTOR DTA144ES	
Q908	8-729-900-65	TRANSISTOR DTA144ES	
Q909	8-729-900-65	TRANSISTOR DTA144ES	
Q910	8-729-900-65	TRANSISTOR DTA144ES	
Q911	8-729-900-89	TRANSISTOR DTC144ES	
Q912	8-729-900-65	TRANSISTOR DTA144ES	
Q913	8-729-900-65	TRANSISTOR DTA144ES	
Q914	8-729-900-65	TRANSISTOR DTA144ES	
Q915	8-729-900-89	TRANSISTOR DTC144ES	
Q916	8-729-900-65	TRANSISTOR DTA144ES	
Q917	8-729-900-65	TRANSISTOR DTA144ES	
Q918	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q919	8-729-900-65	TRANSISTOR DTA144ES	
		〈 RESISTOR 〉	
R001	1-247-752-11	CARBON 1K 5% 1/2W	
R181	1-249-429-11	CARBON 10K 5% 1/4W	
R182	1-249-433-11	CARBON 22K 5% 1/4W	
R183	1-249-423-11	CARBON 3.3K 5% 1/4W	
R184	1-247-704-11	CARBON 220 5% 1/4W	
R281	1-249-429-11	CARBON 10K 5% 1/4W	
R282	1-249-433-11	CARBON 22K 5% 1/4W	
R283	1-249-423-11	CARBON 3.3K 5% 1/4W	
R284	1-247-704-11	CARBON 220 5% 1/4W	
R381	1-247-721-11	CARBON 4.7K 5% 1/4W	
R382	1-247-152-00	CARBON 8.2K 5% 1/4W	
R383	1-247-725-11	CARBON 10K 5% 1/4W	
R384	1-247-721-11	CARBON 4.7K 5% 1/4W	
R385	1-246-545-00	CARBON 1.0M 5% 1/4W	
R386	1-249-462-11	CARBON 22K 5% 1/4W	
R481	1-247-721-11	CARBON 4.7K 5% 1/4W	
R482	1-247-152-00	CARBON 8.2K 5% 1/4W	
R483	1-247-725-11	CARBON 10K 5% 1/4W	
R484	1-247-721-11	CARBON 4.7K 5% 1/4W	
R485	1-246-545-00	CARBON 1.0M 5% 1/4W	
R486	1-249-462-11	CARBON 22K 5% 1/4W	
R590	1-249-429-11	CARBON 10K 5% 1/4W	
R881	1-249-434-11	CARBON 27K 5% 1/4W	
R882	1-249-431-11	CARBON 15K 5% 1/4W	
R901	1-249-421-11	CARBON 2.2K 5% 1/4W	
R902	1-249-421-11	CARBON 2.2K 5% 1/4W	
R903	1-247-895-00	CARBON 470K 5% 1/4W	
R904	1-249-433-11	CARBON 22K 5% 1/4W	
R905	1-249-433-11	CARBON 22K 5% 1/4W	
R906	1-249-429-11	CARBON 10K 5% 1/4W	
R907	1-249-425-11	CARBON 4.7K 5% 1/4W	
R908	1-249-431-11	CARBON 15K 5% 1/4W	
R909	1-249-422-11	CARBON 2.7K 5% 1/4W	
R910	1-249-424-11	CARBON 3.9K 5% 1/4W	
R911	1-249-428-11	CARBON 8.2K 5% 1/4W	
R912	1-249-434-11	CARBON 27K 5% 1/4W	
R913	1-249-422-11	CARBON 2.7K 5% 1/4W	
R914	1-249-424-11	CARBON 3.9K 5% 1/4W	
R915	1-249-428-11	CARBON 8.2K 5% 1/4W	
R916	1-249-434-11	CARBON 27K 5% 1/4W	
R917	1-249-431-11	CARBON 15K 5% 1/4W	
R918	1-249-409-11	CARBON 220 5% 1/4W	
R919	1-249-410-11	CARBON 270 5% 1/4W	
R920	1-249-412-11	CARBON 390 5% 1/4W	
R921	1-249-421-11	CARBON 2.2K 5% 1/4W	
R922	1-249-421-11	CARBON 2.2K 5% 1/4W	
R923	1-247-903-00	CARBON 1M 5% 1/4W	
R925	1-249-425-11	CARBON 4.7K 5% 1/4W	
R926	1-249-441-11	CARBON 100K 5% 1/4W	
R927	1-249-441-11	CARBON 100K 5% 1/4W	
R928	1-249-441-11	CARBON 100K 5% 1/4W	
R929	1-249-433-11	CARBON 22K 5% 1/4W	
R930	1-249-441-11	CARBON 100K 5% 1/4W	
R931	1-249-425-11	CARBON 4.7K 5% 1/4W	
		〈 VARIABLE RESISTOR 〉	
RV541	1-241-330-11	RES, VAR, CARBON 20K/20K (PHONE LEVEL)	
RV591	1-238-833-21	RES, VAR, CARBON 20K/20K (REC LEVEL)	
RV592	1-238-687-11	RES, VAR, CARBON 50K/50K (BALANCE)	
RV593	1-241-329-11	RES, VAR, CARBON 5K/5K (REC LEVEL)	
RV594	1-241-328-11	RES, VAR, CARBON 10K/10K (BIAS)	
		〈 SWITCH 〉	
S541	1-572-583-11	SWITCH, ROTARY (DOLBY NR)	

When indicating parts by reference number, please include the board name.

PANEL

Ref. No.	Part No.	Description	Remarks
S542	1-572-152-11	SWITCH, PUSH (3 KEY) (CALIBRATION/HX PRO/MPX FILTER)	
S591	1-572-153-11	SWITCH, PUSH (1 KEY) (INPUT)	
S592	1-572-582-11	SWITCH, ROTARY (REC EQ CAL)	
S701	1-572-267-51	SWITCH, PUSH (AC POWER) (1 KEY) (POWER)	
S801	1-572-268-11	SWITCH, SLIDE (TIMER)	
S901	1-554-303-21	SWITCH, TACTILE (COUNTER. MEMORY)	
S902	1-554-303-21	SWITCH, TACTILE (COUNTER. RESET)	
S903	1-554-303-21	SWITCH, TACTILE (COUNTER. DISPLAY MODE)	
S904	1-554-303-21	SWITCH, TACTILE (OPEN/CLOSE)	
S905	1-554-303-21	SWITCH, TACTILE (■)	
S906	1-554-303-21	SWITCH, TACTILE (◀◀)	
S907	1-554-303-21	SWITCH, TACTILE (▶▶)	
S908	1-554-303-21	SWITCH, TACTILE (REC)	
S909	1-554-303-21	SWITCH, TACTILE (▶)	
S910	1-554-303-21	SWITCH, TACTILE (PAUSE)	
S911	1-554-303-21	SWITCH, TACTILE (▯◁◁)	
S912	1-554-303-21	SWITCH, TACTILE (▷▷▯)	
S913	1-554-303-21	SWITCH, TACTILE (REC MUTE)	
S914	1-554-303-21	SWITCH, TACTILE (MON/TOR)	
		(CRYSTAL)	
X901	1-577-358-21	VIBRATOR, CERAMIC (4.0MHz)	
		**********	
		MISCELLANEOUS	
		**********	
64	* 1-590-321-51	LEAD (WITH CONNECTOR)	
67	⚠ 1-575-975-11	CORD, POWER (K870ES; US, CA)	
	⚠ 1-575-651-11	CORD, POWER (K870ES; AE4)	
	⚠ 1-575-652-11	CORD, POWER (K870ES; UK)	
	⚠ 1-575-653-11	CORD, POWER (E2/E3)	
146	* 1-608-268-00	PC BOARD, ERASE HEAD	
147	1-543-358-11	HEAD, MAGNETIC (ERASE)	
148	1-543-684-11	HEAD, MAGNETIC (REC/PB)	
234	1-632-779-11	PC BOARD, FG	
T701	⚠ 1-450-511-11	TRANSFORMER, POWER (K870ES; US, CA)	
	⚠ 1-450-512-11	TRANSFORMER, POWER (K870ES; UK, AE4)	
	⚠ 1-450-513-11	TRANSFORMER, POWER (E2/E3)	
		**********	

Ref. No.	Part No.	Description	Remarks
		ACCESSORY & PACKING MATERIAL	
		**********	
	1-558-787-51	CORD, CONNECTION	
	* 3-354-919-31	INDIVIDUAL CARTON (K870ES; US, CA, AE4, E2/E3)	
	* 3-350-464-71	INDIVIDUAL CARTON (K870ES; UK)	
	* 3-350-464-81	INDIVIDUAL CARTON (K222ESL; E2/E3)	
	* 3-366-547-01	CUSHION (K870ES; US, CA, AE4, E2/E3)	
	* 3-363-900-01	CUSHION (K870ES; UK K222ESL; E2/E3)	
	3-703-450-01	INSTRUCTION (K870ES; US)	
	3-752-575-21	MANUAL, INSTRUCTION (ENGLISH)	
	3-752-575-11	MANUAL, INSTRUCTION (ENGLISH/FRENCH/DUTCH/SPANISH)	
		**********	
		HARDWARE LIST	
# 1	7-682-548-04	SCREW +BVTT 3X8 (S)	
# 2	7-682-547-04	SCREW +BVTT 3X6 (S)	
# 3	7-682-548-09	SCREW +BVTT 3X8 (S)	
# 4	7-685-133-19	SCREW +BTP 2.6X6 TYPE2 N-S	
# 5	7-682-547-09	SCREW +BV 3X6, S TIGHT	
# 6	7-682-147-15	SCREW, TR	
# 7	7-621-849-00	SCREW (BV/RING)	
# 8	7-621-775-10	SCREW +B 2.6X4	
# 9	7-628-253-00	SCREW +PS 2X4	
#10	7-621-255-20	SCREW +BVTT 2X4 (S)	
#11	7-621-772-10	SCREW +B 2X4	
#12	7-671-154-01	STENLESS BALL	
#13	7-685-870-01	SCREW +BVTT 3X5 (S)	
#14	7-621-772-70	SCREW +B 2X14	
#15	7-622-205-05	NUT M2 TYPE2	
#16	7-628-254-10	SCREW +PS 2.6X6	
#17	7-682-648-09	SCREW +PS 3X8	
#18	7-621-255-35	SCREW +BVTT 2X5 (S)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

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